50p

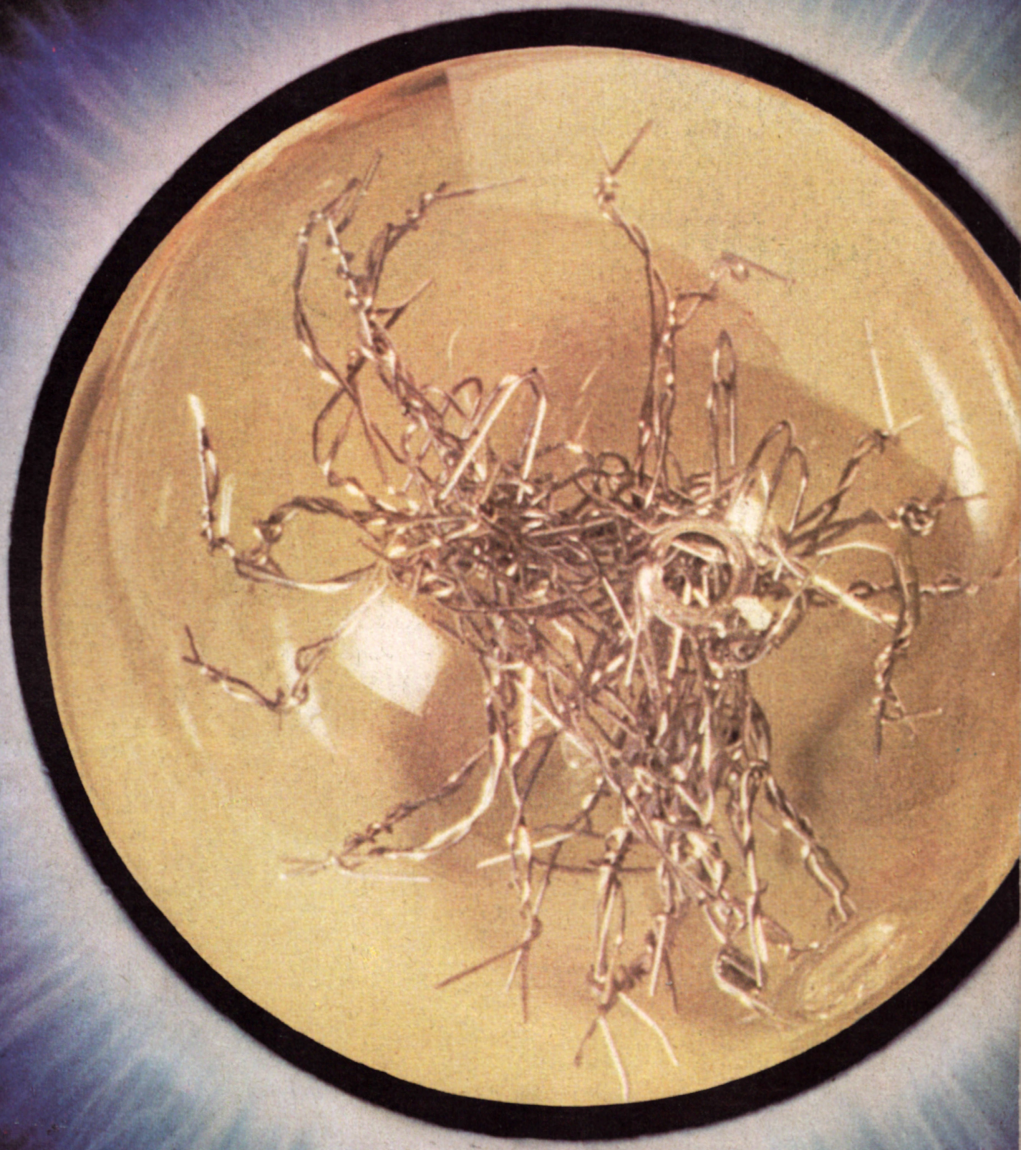
Aus & NZ $1.50 SA R1.50 US $1.50

THE Unexplained

MYSTERIES OF MIND SPACE & TIME

Mind over metal
Puzzling over pyramids
The stigmatic phenomenon
The phantom universe
The jumping coffins

43



THE Unexplained
MYSTERIES OF MIND SPACE & TIME

Published weekly by Orbis Publishing Limited
Orbis House, 20/22 Bedfordbury, London WC2N 4BT

Volume 4 Issue 43

Consultants to The Unexplained
Professor A. J. Ellison
Dr J. Allen Hynek
Brian Inglis
Colin Wilson

Editorial Director
Brian Innes
Editor
Peter Brookesmith
Deputy Editor
Lynn Picknett
Executive Editor
Lesley Riley
Sub Editors
Chris Cooper
Jenny Dawson
Hildi Hawkins

Picture Researchers
Anne Horton
Sarah Smith
Paul Snelgrove
Editorial Manager
Clare Byatt
Art Editor
Stephen Westcott
Designer
Richard Burgess
Art Buyer
Jean Hardy
Production Co-ordinator
Nicky Bowden
Circulation Director
David Breed
Marketing Manager
Michael Joyce

Contents

Mysteries of Egypt
THE PUZZLE OF THE PYRAMIDS 841
No record has been found of how the pyramids were built. We present the best of the theories!
Humphrey Evans

Stigmatics
AN OUTWARD AND VISIBLE SIGN 846
Just what causes the wounds of Christ to appear on living people today?
Bob Rickard

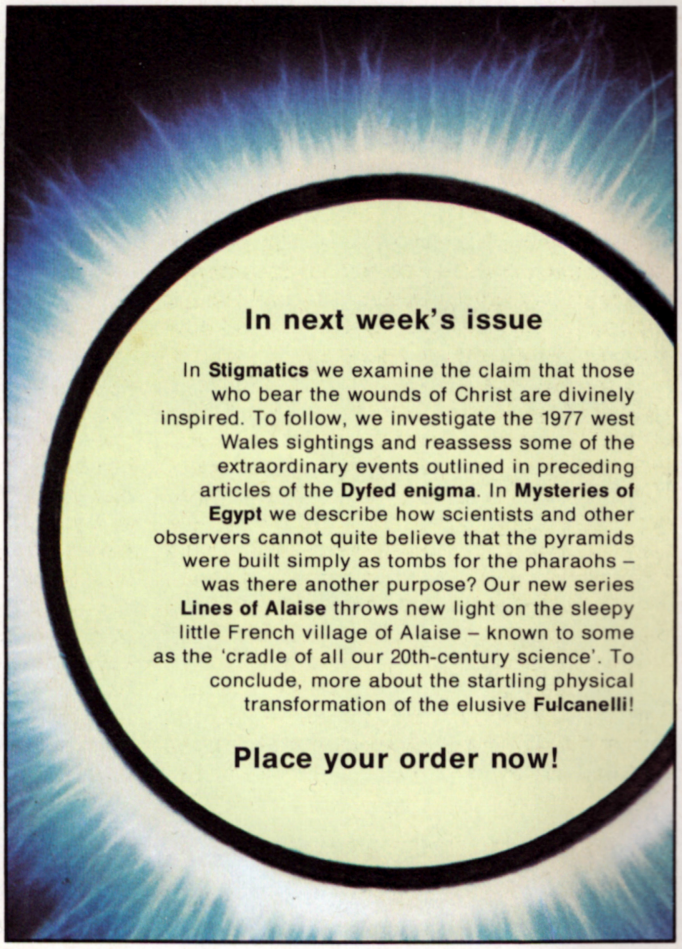
Barbados coffins
TURNING IN THE GRAVE 850
Who or what tampered with lead-lined coffins that were found hurled about in a sealed vault?
Graham Fuller and Ian Knight

Physics and psi
THE PHANTOM UNIVERSE 854
How do the dialectic concepts of space, time and consciousness affect our understanding of the paranormal?
Archie Roy

ESP on test
MIND OVER METAL 858
We take a look at metal bending and discuss the age-old mystery of mind interacting with matter
Guy Lyon Playfair

Picture acknowledgements
Cover: Photri; Arnold Desser (inset); **841:** illustration by Angus McBride; **842:** Sonia Halliday (t); map by Colin Edwards (bl); Humphrey Evans (br); **843:** ZEFA (b); **844:** William MacQuitty (t); Michael Holford (c); **845:** artwork by Studio Briggs (b); **846:** René Dazy; **847:** Pixfeatures; **848:** Popperfoto; **849:** René Dazy (t); Mary Evans Picture Library (b); **850-851:** Spectrum Colour Library; **852:** Topham; **853:** Topham (l and c); artwork by Graham Bingham (b); **854:** Science Photo Library; **855:** ILN (t); artwork by Studio Briggs (b); **856:** Popperfoto (c); Science Photo Library (cbl and cbr); artwork by Studio Briggs (b); **857:** Science Photo Library (c); artwork by Studio Briggs (bl and br); National Portrait Gallery, London (bc); **858:** Arnold Desser (t); Syndication International (b); **859:** Prof. J. Hasted (t); Elmer Gruber (b); **860:** Eldon Byrd (t and c); Syndication International (b)

© 1981 Orbis Publishing Limited. Typesetting by Servis Filmsetting Limited. Reproduction by Hilo Offset. Printed in Great Britain by Jarrold & Sons Ltd, Norwich


In next week's issue
In **Stigmatics** we examine the claim that those who bear the wounds of Christ are divinely inspired. To follow, we investigate the 1977 west Wales sightings and reassess some of the extraordinary events outlined in preceding articles of the **Dyfed enigma**. In **Mysteries of Egypt** we describe how scientists and other observers cannot quite believe that the pyramids were built simply as tombs for the pharaohs – was there another purpose? Our new series **Lines of Alaise** throws new light on the sleepy little French village of Alaise – known to some as the 'cradle of all our 20th-century science'. To conclude, more about the startling physical transformation of the elusive **Fulcanelli**!
Place your order now!

The Unexplained Price U.K. 50p. Aus. & N.Z. $1.50. S.A. R1.50. U.S.A. $1.50.
How to obtain copies of The Unexplained Copies are obtainable by placing a regular order at your newsagent, or by taking out a subscription.
Subscription Rates
For six months (26 issues) £15.00, for one year (52 issues) £30.00. Send your order and remittance to The Unexplained Subscriptions, Punch Subscription Services, Watling Street, Bletchley, Milton Keynes, Bucks MK2 2BW, being sure to state the number of the first issue required.
Back numbers
U.K. & Eire: Back Nos are obtainable from your newsagent or from The Explained Back Nos. Orbis Publishing Ltd, 20/22 Bedfordbury, London WC2N 4BT – 50p each, post free.
Australia, New Zealand, South Africa, Europe & Malta: Back Nos are available at cover price from your newsagent. In case of difficulty write to the address in your country given for binders. South African readers should add sales tax.
How to obtain binders for The Unexplained
U.K. and Eire: Send a cheque/postal order for £3.25 per binder (incl. p & p) payable to Orbis Publishing Ltd to: The Unexplained Binders, Orbis House, 22 Bedfordbury, London WC2N 4BT. Please state the volume numbers required.
Australia: Binders are available through your local newsagent price $7.25. In case of difficulty write to The Unexplained Binders, Gordon and Gotch (Aus) Ltd, 114 William Street, PO Box 767G, Melbourne, Vic. 3001.
New Zealand: Write with remittance of $6.60 plus $1.21 sales tax per binder to The Unexplained Binders, Gordon and Gotch (NZ) Ltd, PO Box 1595, Wellington.
South Africa: Binders are available through your local newsagent or through any branch of Central News Agency, price R5.75, (please add sales tax). In case of difficulty write to The Unexplained Binders, Intermag, PO Box 613 Cape Town, PO Box 938 Durban or PO Box 10799 Johannesburg.
Europe: Write with remittance of £4.00 per binder (including postage and packing) payable to Orbis Publishing Ltd, to The Unexplained Binders, Orbis Publishing Ltd, 20/22 Bedfordbury, London WC2N 4BT, England, being sure to state the volume number(s) required.
Malta: Binders are obtainable by ordering from your local newsagent price £3.25. In case of difficulty write to The Unexplained Binders, W.H. Smith–Continental Ltd, Po Box 272, 18a Scots Street, Valletta.
NOTE: Binders and Back Numbers are obtainable subject to availablity of stocks. Whilst every attempt is made to keep the price of issues and binders constant, the publishers reserve the right to increase the stated prices at any time when circumstances dictate. Binders depicted in this publication are those produced for the **U.K. market only** and may not necessarily be identical to binders produced for sale outside the U.K.

The puzzle of the pyramids

For more than 40 centuries the pyramids, towering above the Nile, have been a source of wonder: but how were these enigmatic monuments built, and why? HUMPHREY EVANS reports on the theories of modern researchers

PYRAMIDS ARE the very symbol of Egypt, whose ancient civilisation was so complex and so splendid in its powers. There they stand, each one a massive, brooding presence set against the empty desert, its simple shape apparently easy to comprehend and yet ambivalent, confusing, mysterious.

Egyptian pyramids are big. That makes a difference. Seen in a diagram or as a model, a pyramid looks straightforward: four faces, a topmost point and passageways leading to a chamber within the structure. Stand close beside a pyramid, raise your eyes towards the summit, and thoughts of faces and points become irrelevant. Half the world is stone; the other half is sky. Climb inside, and the cramped and humid passageways will quickly disorient you.

And pyramids keep their secrets. We can only guess at why the Egyptians raised the pyramids. We have to speculate about the building techniques they used. We do not have definitive solutions to these problems because no account surviving from ancient Egypt has yet been discovered. The only real record lies in the pyramids themselves.

During the Third Dynasty, in about 2650 BC, the first pyramid, the Step Pyramid of King Zoser, was constructed. Zoser's Step Pyramid dominates the Saqqâra skyline. Imagine its impact when it was first built! The citizens of Memphis, then the capital of Egypt, a little to the south of present-day Cairo, would lift up their eyes to the hills that marked the beginning of the western desert to see the six levels of this memorial to their dead king rising up a further 200 feet (60 metres). This first pyramid is also a record of experiment in stone – previous tombs had been made of mud brick.

It all began with a single-storey tomb of solid stone, with a burial chamber driven about 100 feet (30 metres) into the rock beneath. The builders then set about extending it but, before completing this stage, they apparently had the idea that sparked off the pyramid age: they added three more layers to make a four-step pyramid. Even so, they were still not done. They extended the base still further and added the final two steps. It

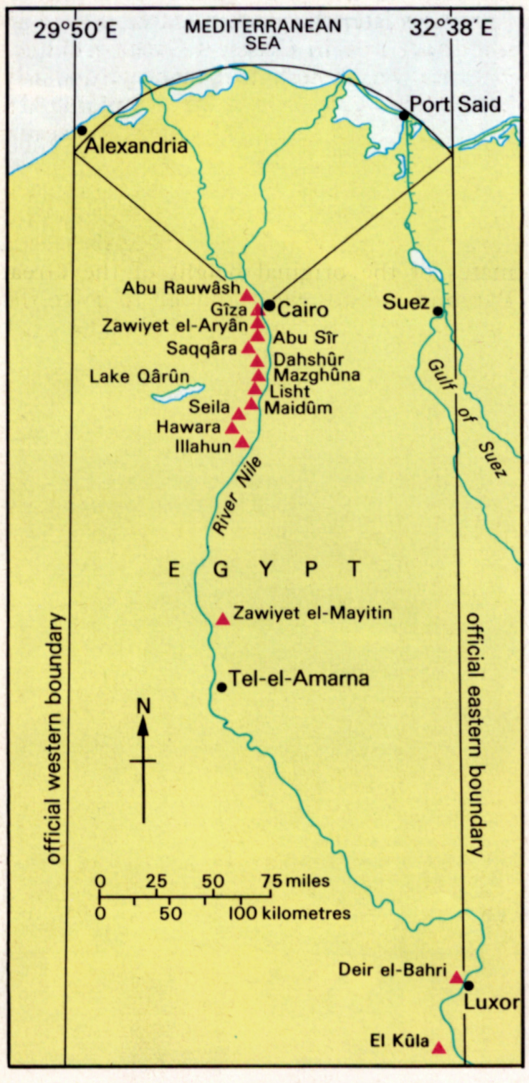
Many modern Egyptologists agree that the most likely means of raising the building blocks of a pyramid was a mud-brick ramp that wound gradually round the monument. This would result in a stepped pyramid rather like that at Zoser (overleaf); then additional blocks to complete the work could be hauled to the top of the ramp and put into place as the ramp itself was gradually dismantled

is possible that this stepped pyramid represents the dead king's stairway to the stars. The later, smoothed-off versions may have been modelled on the *ben-ben* stone, the emblem of the Sun-god, which, raised up on a column, could also become an obelisk.

Even the structures around the pyramid pose problems of interpretation. Were the buildings and courtyards the scene of some ceremony while Zoser was alive, or the haunt of priests and pilgrims who maintained his cult after his death, or even the arena where the dead king's spirit could work its magic? Later pyramids developed a fairly standard pyramid complex, which included the pyramid, a mortuary temple, or offering place, built against its eastern face and a causeway that connected it with a building on the edge of the cultivated plain bordering the Nile.

Zoser's successors left the beginnings of two or three more aborted step pyramids before turning to the first attempt at a true pyramid with smoothed-off faces, at Maidûm, about 40 miles (65 kilometres) south of Cairo. Maidûm today is a ruin, its central core rising 250 feet (75 metres) or so from a mound of rubble that was once part of the pyramid itself. It started as a step pyramid, the sides of which were then faced

Above: the first true pyramid, raised above the tomb of King Zoser at Saqqâra about 2650 BC. Its original height was over 200 feet (60 metres)



Left: about 40 important pyramids can be found at various sites along the Nile, but the positioning of the Great Pyramid is remarkable. It stands exactly halfway between the eastern and western boundaries of ancient Egypt, and a quarter circle drawn with the pyramid at its centre closely circumscribes the Nile delta

Below: 'Stand close beside a pyramid, raise your eyes towards the summit . . . half the world is stone; the other half is sky.' This view of the Great Pyramid shows clearly how the stones were fitted together

to form one continuous slope. Unfortunately, the extended base rested on sand instead of bedrock, and the pyramid collapsed, possibly before having been completed.

However, the builders learned from this experiment. The next king, Sneferu, the first king of the Fourth Dynasty (which lasted roughly from 2500 BC to 2400 BC), built two substantial pyramids at Dashûr, just south of Saqqâra. Then came the three pyramids at Gîza: the Great Pyramid of Cheops, whose Egyptian name was Khufu; its equally large companion built by Chephren or Khafre; and the smaller pyramids of Mycefinus or Menkaure. The Great Pyramid is unique in having passageways and chambers high in its structure: virtually all other pyramids have a single passage leading down to a small chamber at ground level or in the rock below. It is also the high point of pyramid construction, both literally and figuratively. Originally it stood just over 480 feet (146 metres) high, on a base just under 760 feet (231 metres) along each side, although the smooth facing stones have long since been taken off to be incorporated in the medieval buildings of Cairo, and so its height today is about 450 feet (137 metres). No one built a pyramid that high again. No one built to such a standard.

After Gîza, Fifth and Sixth Dynasty kings built pyramids at Saqqâra and at nearby Abu-Sîr. In even the best of these the interior stones were roughly worked, and in the later ones the core consisted of small stones bonded with Nile mud. Once the limestone facing had been stripped away by later generations, the core fell apart. By the end of the Sixth Dynasty, about 2180 BC, Egypt had split into a confusion of provinces, and vast monuments went out of favour. The Eleventh and Twelfth Dynasties saw Egypt united once again, and during a period lasting from 2000 BC to 1750 BC kings once more raised pyramids. These were less than half the height of the Great Pyramid and

often roughly built. In some cases the inner core consisted mainly of mud bricks, held in place with reinforcing walls. These were the last pyramids to be constructed. Later kings built extensive temples, which would demonstrate their might while still alive, and hidden tombs, which would keep them safe when dead.

Gîza and the Great Pyramid of Cheops encapsulate all the mysteries associated with the building of the pyramids. What was the purpose of the Great Pyramid, for a start? A fairly obvious suggestion is that it may have been a tomb, and there is a sarcophagus in what is now called the King's Chamber. However, there is no indication that any actual funeral took place. The last passageway before the King's Chamber is the magnificent Grand Gallery – at its base 156 feet long, 28 feet high, 7 feet wide (47.5 by 8.5 by 2 metres), but stepping in towards the ceiling and sloping steeply up at an angle of 26°. It may be that Cheops's ritualists planned a final great procession up the incline, but this still leaves a problem unsolved: the corridor that runs up to the start of the Grand Gallery is so low that people climbing it have to bend double.

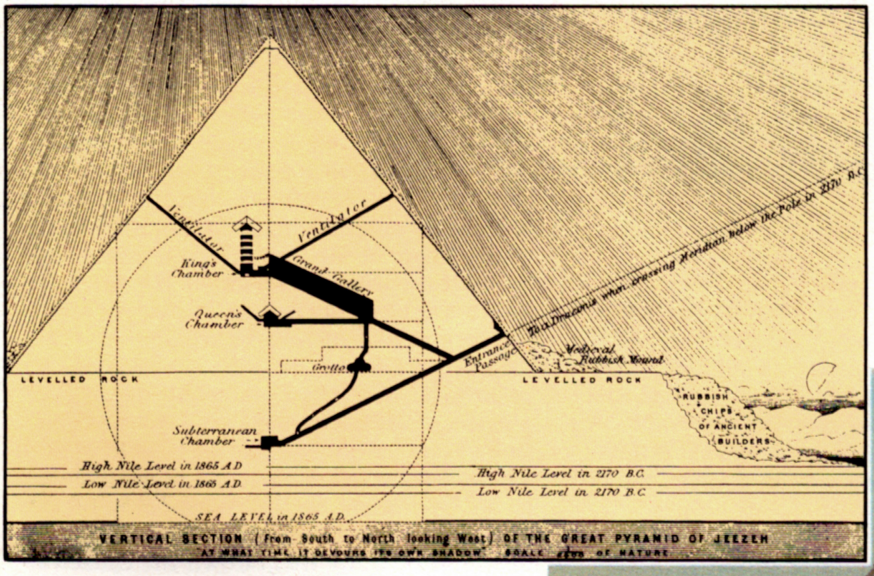
Why was the Great Pyramid built on that site? Perhaps because that is where the ancient Egyptians were. They built the pyramids on the scarp of the Nile valley, where all the royal tombs were built, because that was the western horizon. From Memphis, the shapes could be seen silhouetted against the setting Sun, with which the destinies of the dead kings' spirits were linked.

Lately, however, people have speculated that there was more to the choice than that. According to these theorists, whose views are explained in detail by Professor Livio Catullo Stecchini in Peter Tompkins's book *Secrets of the Great Pyramid*, the ancient Egyptians had a much more advanced awareness of geography and cosmology than they are given credit for. Stecchini claims that the Egyptians knew, for example, that the Earth was round and that they had been able to calculate distances for degrees of latitude and longitude, an operation equivalent to measuring the circumference of the Earth.

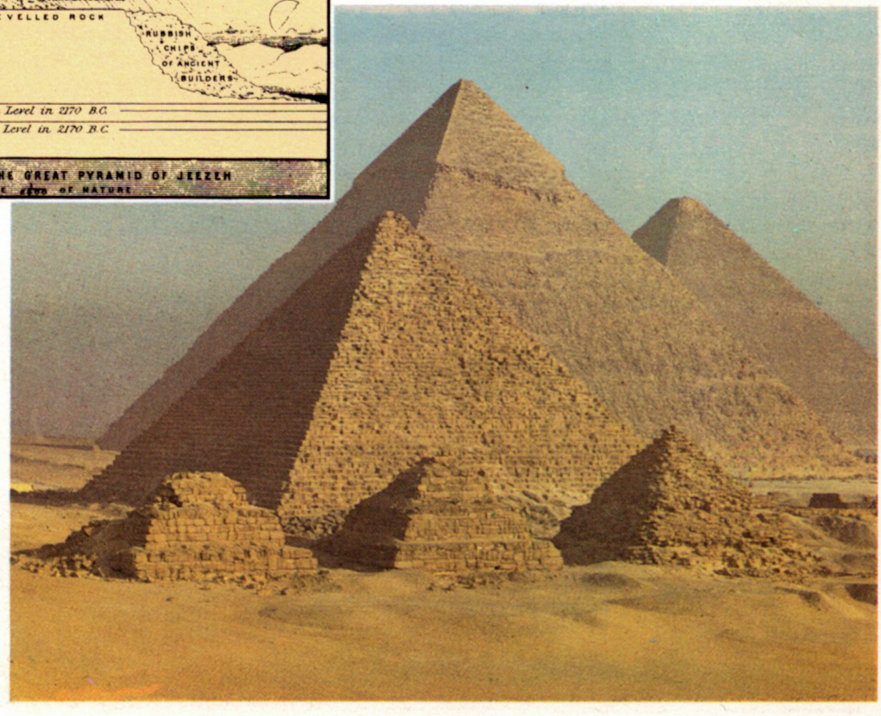
Professor Stecchini goes on to say that, on the grandest scale, the Egyptians laid out their entire country to demonstrate this knowledge, positioning borders, cities and major temples at points significant in terms of latitude and longitude and at distances measured in good round numbers. The length of Egypt as a whole thus became exactly 1,500,000 royal cubits (a cubit was approximately equal to the length of a man's forearm). So powerful was this notion that other peoples too, Stecchini claims, located their own important centres at sites chosen for their distances from, and their angles to, the main Egyptian meridians.

The Great Pyramid incorporates other messages. Stecchini claims, as others have done, that the relation between its height and its base gives the value of *pi*, the ratio of the circumference of a circle to its diameter. Likewise the Pyramid is said to embody *phi*, the golden section that divides a line so that the ratio of the shorter to the longer equals the ratio of the longer part to the whole. Centuries later the golden section played an important role in Classical Greek architecture, as it was thought to provide particularly harmonious proportions for a building. In the case of the Great Pyramid, however, calculations based on the principle of the golden section would make the area of each face of the Pyramid equal to the area of a square drawn on its height. Modern estimates of the original height of the Great Pyramid are not exact enough to solve the conundrum once and for all. In any case,

Below: a cross-section of the Great Pyramid prepared by Charles Piazzi Smyth, the Astronomer Royal for Scotland and Professor of Practical Astronomy at Edinburgh University, in 1864. Smyth believed that the entrance passage was aligned with the position of the star alpha Draconis in the year 2170 BC. Other aspects of Smyth's analysis of the geometry of the pyramid can also be seen in the diagram


Ventilator
Ventilator
King's Chamber
Grand Gallery
Queen's Chamber
Grotto
Entrance Passage
Mediæval Rubbish Mound
LEVELLED ROCK
LEVELLED ROCK
RUBBISH CHIPS OF ANCIENT BUILDERS
Subterranean Chamber
High Nile Level in 1865 A.D.
Low Nile Level in 1868 A.D.
High Nile Level in 2170 B.C.
Low Nile Level in 2170 B.C.
SEA LEVEL in 1865 A.D.
VERTICAL SECTION (From South to North looking West) OF THE GREAT PYRAMID OF JEEZEH
AT WHAT TIME IT DEVOURS ITS OWN SHADOW
SCALE OF NATURE

Bottom: the group of pyramids at Gîza, with the Great Pyramid in the foreground



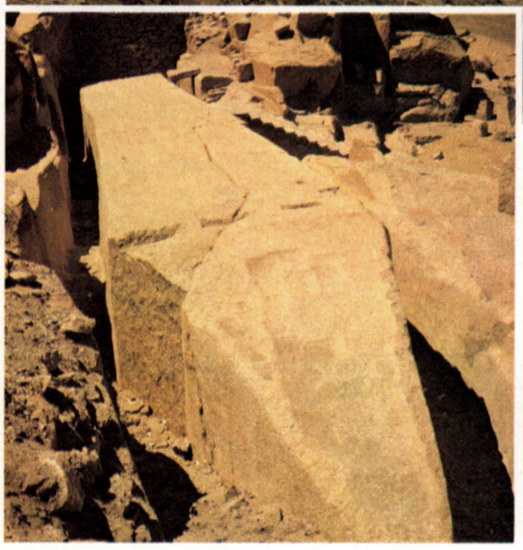
there remains the problem of why the other pyramids are built on different slopes.

Just for the record, the Great Pyramid, it is estimated, is built of 2,500,000 blocks of limestone of an average size of 4 by 4 by $2\frac{1}{2}$ feet (1.2 by 1.2 by 0.75 metres) and weighing 2.5 tonnes. The biggest blocks are as heavy as 15 tonnes. In all, the Great Pyramid contains about 90 million cubic feet (2,700,000 cubic metres) of stone, weighing a total of about 6 million tonnes – about twice the weight of the Empire State Building in New York.

The most accurate measurements of the Great Pyramid were taken in 1925 by James Humphrey Cole, who was able to identify the original position of the corners, although the blocks themselves are missing, and to measure the sides with an error of less than $1\frac{1}{2}$ inches (3.8 centimetres). He published these dimensions for the sides of the Pyramid: north, 755.414 feet (230.253 metres); south, 756.073 feet (230.454 metres); east, 755.866 feet (230.391 metres); west, 755.755 feet (230.357 metres). This made the difference between the longest and the shortest sides a matter of only 7.9 inches (20.1 centimetres). He found that the 'worst' oriented side was less than one tenth of a degree off true north.

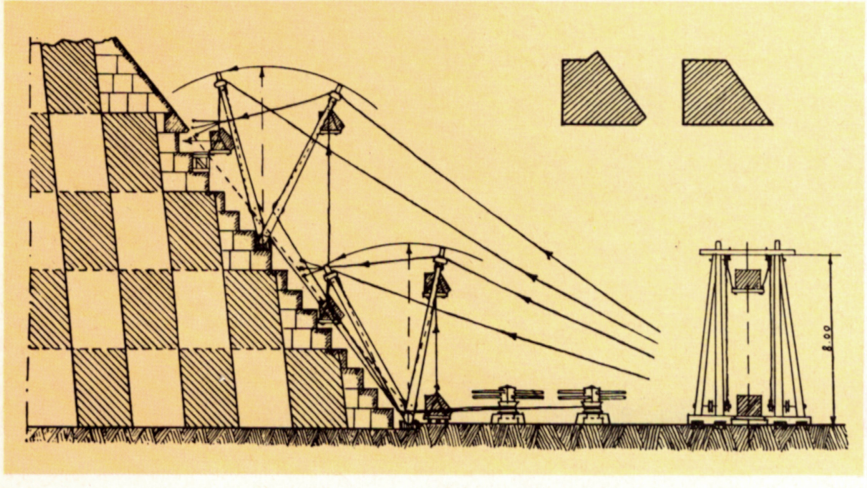
Cole made no attempt to estimate the original height of the Great Pyramid, but he accepted that the faces sloped at approximately 50°51′ and this gives a figure of 481.12 feet (146.65 metres). An earlier survey by the archaeologist Sir Flinders Petrie, published in 1883, made the height 481.30 feet (146.70 metres).

Most estimates suggest that the Great Pyramid took between 20 and 30 years to build; that between 4000 and 10,000 men worked on it continuously, with hundreds more in the quarries; that during the three or four months of late summer, when the Nile flooded, levies of up to 100,000 men hauled the next year's supply of stone to the site and raised finished blocks to the construction level. Much of the poorer-quality stone for the core came from nearby quarries – the Sphinx is carved from an outcrop of harder rock left in one of them – but granite to line the internal chambers came from far up the Nile, and the finer limestone for the facing stones came from the Tura quarries burrowed into the Mokattam hills, which lie across the river to the east of Cairo.



Above: the pyramid of Zoser and another, crumbling, at Saqqâra

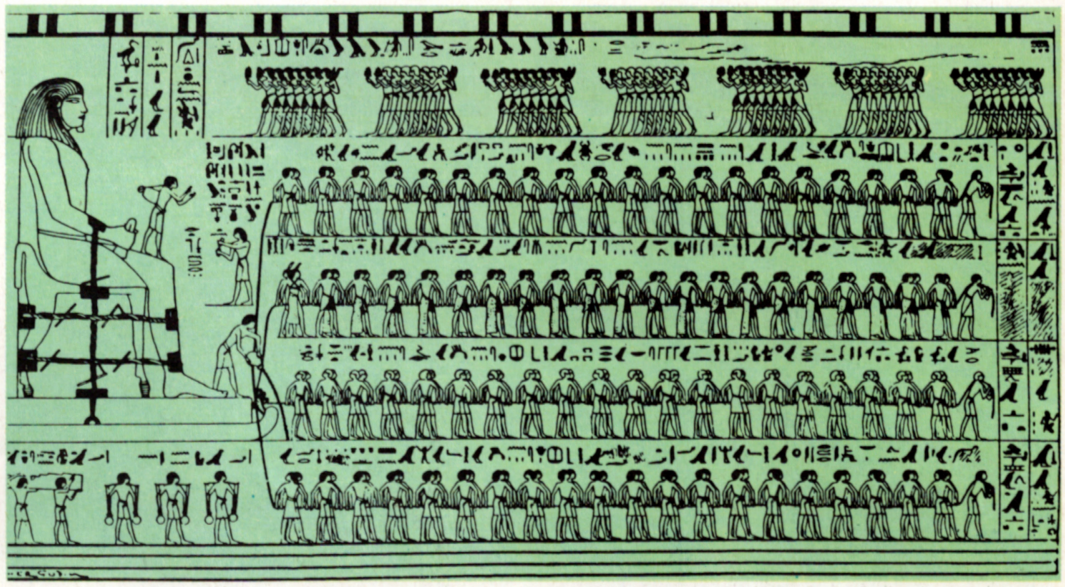
Left: an unfinished obelisk, as it was left in the quarry at Aswan. It is clear that the masons were confident that they would be able to move this as a single massive piece of stone: but how?



Below: another theory to explain how the building blocks of the pyramids could have been raised. This suggestion, based upon a vague description by the ancient Greek traveller Herodotus, is by H. Straub-Roessler

Petrie spelt out how he thought 100,000 men (the number reported by Herodotus) organised their work. A party capable of handling a block of average size – 40 cubic feet (11.32 cubic metres) or 2.5 tonnes – would consist of eight or so men. Each of these, he thought, would transport 10 blocks during their three months labour, taking a fortnight to bring them down the causeway at the quarries, a day or two of good wind to take them across the stream and six weeks to carry them up the pyramid causeway. They would then have four weeks in which to raise finished blocks into place on the pyramid. At every stage they almost certainly dragged the blocks along on wooden sledges; a slurry of mud and water was poured in front of the sledges to lubricate the runners.

Over the years, engineers with an interest in Egyptology have ruminated on the construction methods that the Egyptians might have used. One, for example, suggested that the builders installed rudimentary cranes at various levels of the pyramid, with long lifting ropes running down through a series of pulleys to a giant capstan at ground level. (Experts, however, claim that the Egyptians



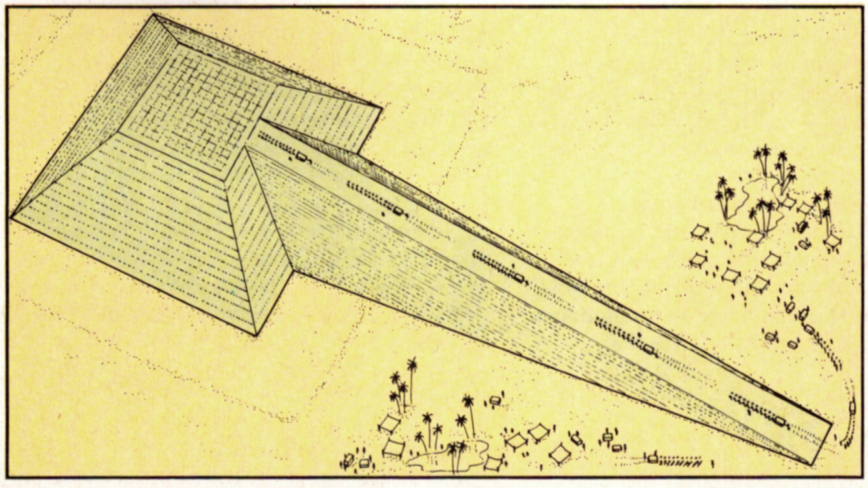
Right: documentary evidence to support the theory that the building stones for the pyramids were transported on wooden sledges. Here a team of about 150 men is moving a giant statue of a seated figure. Notice, in particular, the timekeeper standing on the figure's knee, and the man pouring some sort of lubricant from a jar in front of the sledge runners

did not have pulleys.) A French architect, August Choisy, thought that the Egyptians might have used twin levers to lift the blocks straight up before sliding them sideways on to higher levels. Others have returned again and again to the idea of the balance arm, a stout beam supported on a pillar about 6 feet (2 metres) high. By slinging a block from the shorter arm of such a beam, which might be about 3 feet (1 metre) long, and hanging counterweight rocks from the other arm, which could be up to 15 feet (4.5 metres) long, workers could raise the block into the air and position it on a sledge or some other support. One of the engineers to plump for the balance arm in recent years, Olaf Tellefsen, a Norwegian-born naval architect, came up with a theory of 'direct assault'. Tellefsen suggested that gangs of 25 or 30 men might have pulled the laden sledges up greased slipways set directly against the sloping faces of the pyramid.

Many people have suggested that the Egyptians hauled the blocks of stone up mud-brick ramps. One tomb painting does indeed show a ramp in use for the setting up of temple columns, and remains of ramps can be found at a couple of pyramid-building sites. A papyrus has survived in which are noted calculations to determine the number of bricks needed for a ramp 1200 feet (366 metres) long and 90 feet (27.5 metres) wide leading up to a height of 100 feet (30.5 metres). Unfortunately, there is a daunting difference between a modest ramp of this size and one many times longer that would have been needed for the Great Pyramid. Some people think the Egyptians relied on subsidiary ramps that wound around the Pyramid, although there is the objection that these would provide too insecure a base for levering large blocks into position.

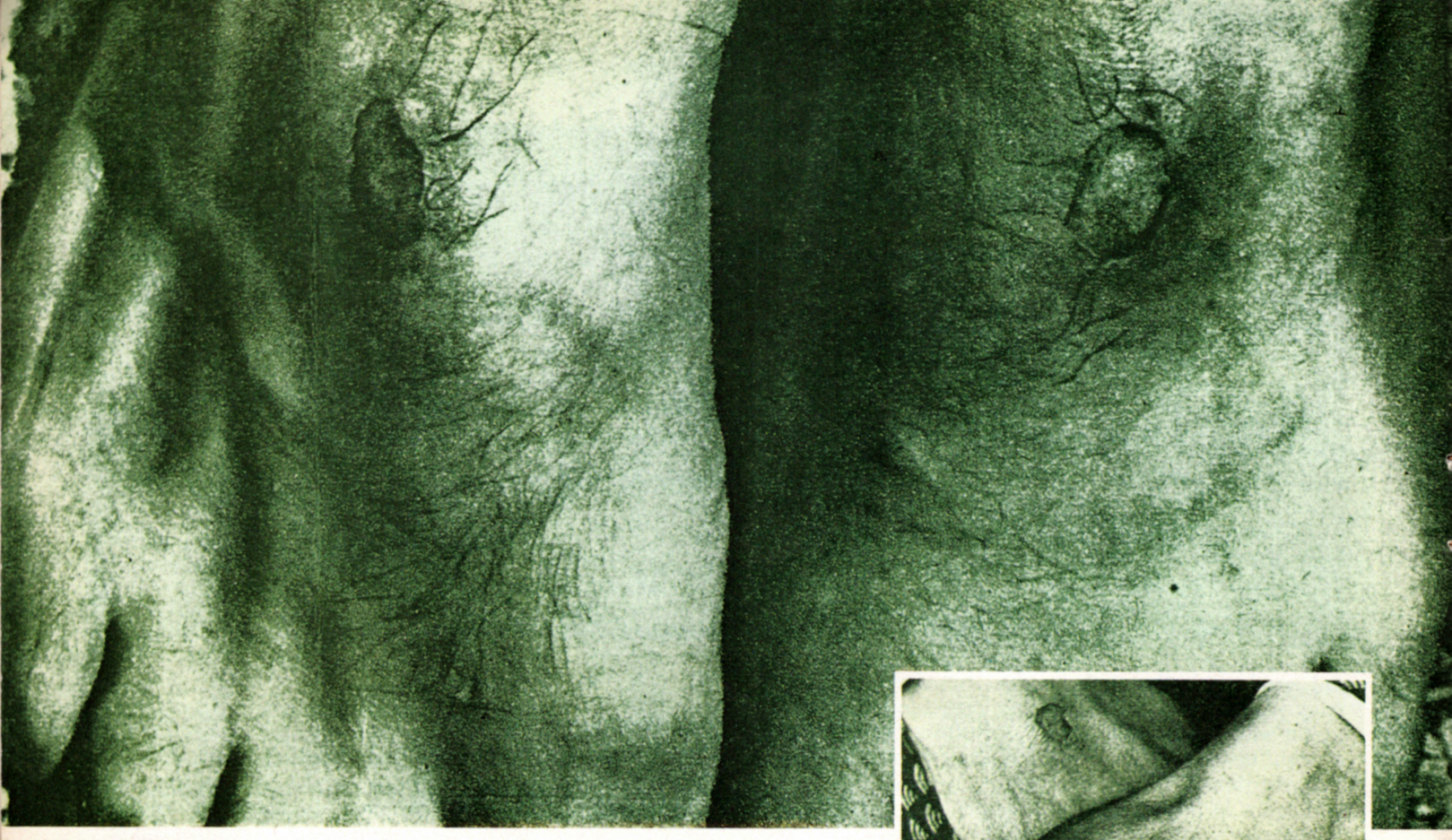
Herodotus did mention machines that raised the blocks step by step. (Later Arab historians, however, equally blandly assured their readers that the ancient Egyptians laid magic talismans atop the blocks, which could then be shifted easily from place to place.) Sir Flinders Petrie suggested that Herodotus's 'machines' may have been so rudimentary that there is nothing surprising about the fact that no trace of any crane-like structure has ever been found. He thought that the Egyptians might have used sledge-like rockers with curved runners. They would place a block on a rocker, he suggested, then start swinging it backwards and forwards. They would then slip thin planks beneath each end alternately as they pushed on the block to keep it rocking. In this way it would gradually 'climb' upwards. John Fitchen, Emeritus Professor of the Fine Arts at Colgate University, New York, extended this idea by suggesting that the builders purposely made part of the face of the unfinished pyramid into a giant stone staircase. Gangs of workers could then jack the blocks up, step by step.

Sadly, as no ancient Egyptian description of how the pyramids were built has been found, the method of their construction may be a secret they are fated to retain.



Below: as an alternative to the theory of a spiral ramp winding round a pyramid under construction, it has been suggested that the stones were brought up a single ramp that was widened and strengthened as it was gradually raised to a greater height

On page 869: the mystical and healing powers of the Egyptian pyramids



An outward and visible sign

Some deeply religious Christians share in Christ's sufferings in a bizarre and very literal way: their bodies develop wounds as if they had been crucified. BOB RICKARD examines the phenomenon of stigmata

ONE FRIDAY IN MARCH 1901 a young Italian girl prayed before a large lurid crucifix, and experienced a vision that changed her life. Her name was Gemma Galgani; she was 23 years old and an orphan. She wanted to become a Passionist nun, but was refused because of her spinal tuberculosis; instead, this simple, quiet and fervently devout girl became a domestic help in the local village. But her vision lifted her out of the ordinary, as she identified with Jesus's suffering, experiencing with combined agony and ecstasy each blow of the lash.

When she was found in her room by her adopted mother, her arms and back were covered with wounds like whip marks and her clothes were soaked in blood. From that day until she died two years later these stigmata appeared with astonishing regularity each Thursday, vanishing the next day. Her biographer, Father Germano di Stanislao, described how her wounds developed at the onset of her ecstasy, reddening slowly on the backs and palms of both hands; '. . . under the epidermis a rent in the flesh was seen to open by degrees . . . after a little the membrane burst and on those innocent hands were seen the marks of flesh wounds.' They were very deep, apparently passing right through the hand itself. They were full of blood, 'partly flowing, partly congealed', and out of consideration for the pain they caused the girl, Father Germano never probed them. On Friday the wounds closed quickly, leaving only a whitish mark by Sunday. The location of the marks varied from week to week, said Father Germano, sometimes appearing on the hands or feet only, sometimes bleeding through an unruptured skin. At other times the appearance of nails with thick heads could be seen in the wounds, formed out of mounds and ridges of darkened flesh and dark, solidified blood.

Above and above right: these details from a 1949 photograph show the stigmatised feet and hands of Arthur Otto Moock, the 'Hamburg stigmatic' whose wounds appeared on 13 December 1943. His flesh was pierced as if by large nails, and fresh blood issued from the holes. Sceptics who are presented with stigmata tend to fall back on accusations of fraud (meaning that the wounds are self-inflicted), but in almost all known cases of stigmata there is no evidence to support this theory

Despite the scorn of sceptics, there can be no doubt about the reality of stigmatic phenomena. They have occurred too many times under close medical scrutiny to be a fiction. And although the greatest body of

evidence lies in the hands of the Catholic Church and is inaccessible, we have more than enough proof of their existence from the testimony of doctors and other impeccable witnesses cited in many official biographies, and in modern times the marks have been photographically recorded.

So what are these marks? Popularly the word *stigmata* is taken to mean the wounds suffered by Christ during his arrest, trial and execution – events known collectively as the Passion – and which are reproduced on the body of the stigmatic. Traditionally these are the wounds corresponding to those made by the nails in the hands and feet, and the spear wound in the side of the chest. There are also supplemental stigmata, often appearing on their own: scourge marks on the body, holes in the forehead as if made by a crown of thorns, a deformed shoulder said to be from the weight of the cross, and more bizarrely, curious symbols were said to be imprinted onto the heart and other internal organs.

Genuine stigmata have very interesting physiological characteristics that differentiate them from ordinary flesh wounds. The blood that flows from them is clean arterial blood with no trace of disease. The wounds may stay open for long periods, sometimes years, with a complete inhibition of normal healing processes, despite which they remain free of infection and inflammation. In a fashion that is not understood, these wounds can come and go spontaneously, but are usually associated with a special state of consciousness, related to trance, in which the stigmatic experiences a union with the suffering of Christ's Passion, and which provides the 'pattern' for what is happening to the stigmatic's own body. Unlike any other kind of wounds (except perhaps some of more obvious psychosomatic origin), most stigmata recur regularly, some during Lent and Easter every year, and some on special Church feast days only, and others every Friday, especially Easter Friday.

Clemente Dominguez, a Spanish mystic and self-appointed 'Pope', regularly developed stigmata such as the 'crown of thorns' (right) and the side-wound (below) during his trances in the 1970s. He was no humble or modest stigmatic; instead of retiring from the public gaze he flaunted his wounds and revelled in the adoration accorded him by those who believed him to be a saint

The first stigmatic

Although St Paul wrote '. . . let no man trouble me, for I bear in my body the marks of the Lord Jesus' (Galatians 6:17), we have no definite evidence of stigmata until 1224, the year in which St Francis of Assisi was stigmatised while in a spiritual retreat on Mount Alvernia, in the Italian Apennines. Praying outside his cave, he saw a winged seraph in the skies, then fell in a swoon. Contemporary accounts say the stigmata appeared as the saint struggled up from the ground and called for help.

His biographer, Thomas Celano, writing three years after the saint's death in 1226, described these unique wounds:

> His hands and feet seemed pierced in the midst by nails, the heads of the nails appearing in the inner part of the hands and in the upper part of the feet, and their points over against them. . . . Moreover his right side, as if it had been pierced by a lance, was overlaid with a scar, and often shed forth blood so that his tunic and drawers were . . . sprinkled with sacred blood.

It is interesting to note that Celano is describing not just a wound but a nail-like formation of tissue apparently lodged in the wound. Those in the feet protruded so much that St Francis could not walk. At the saint's death many filed past his body, which was still displaying these peculiar formations 'marvellously wrought by the power of God . . . implanted in the flesh in such wise that if they were pressed in on either side they straightway, as if they were one piece of sinew, projected on the other.' So bizarre is this detail that many historians have dismissed it as an embellishment, but medical testimony to similar formations – for example those in the hands of St Gemma Galgani – suggest its authenticity.

This dramatic event obviously made a deep and lasting impression on the medieval imagination. Soon other cases were reported – genuine and spontaneous stigmatisations that were thoroughly witnessed and documented. And they have been occurring right

Padre Pio Forgione, who died in 1968, was one of the most revered and best-known of all stigmatics. Since he was stigmatised in 1915 at the age of 28, this Capuchin friar sought to hide his terrible hand-wounds (right), appearing in public only to say mass (above). There is no doubt that his stigmata were real; doctors examined them many times over the years and discovered his palms to be permanently pierced right through. Padre Pio suffered constant pain in his hands but bore it uncomplainingly

up to the present; indeed, they may even be more frequent today than ever before. An extensive listing of stigmatics was attempted in 1894 by Dr Imbert-Gourbeyre, who reached the total of 321 cases. A survey conducted in the 1950s by the subject's great authority, Father Herbert Thurston, suggests that this figure is conservative.

Another curious statistic is the extraordinary high proportion of female stigmatics; in Dr Imbert-Gourbeyre's figures only 41 were male, and only one of these was stigmatised fully – St Francis himself. Other male stigmatics are mentioned by Father Thurston and also by the occult writer Montague Summers, but they are without the full complement of marks, do not suffer periodic bleeding, or lack proper authentification.

The only other known fully stigmatised man since St Francis has been the Capuchin friar Padre Pio Forgione, most of whose humble life was spent at the monastery of San Giovanni Rotondo at Foggia, Italy, and who died in 1968. In 1915, aged 28, he emerged from a long meditation with a stinging sensation in his hands. Three years later he was alone in the choir, celebrating the Feast of the Stigmata of St Francis, when his piercing cry brought his brothers running. They found him unconscious, bleeding profusely from the traditional sites of all five of Christ's wounds. He begged for this to be kept a secret, but word spread. Regularly, as he lifted the Host during mass, he would pass into ecstasy and a cupful of blood and serum would flow from his wounds every day. He could move only with pain and difficulty but tried to remain private and to conceal his hands; however, public adulation was so great that he was under almost constant observation and pursuit, not to mention the dispassionate scrutiny of the Vatican.

The life of St Mary Magdalen de'Pazzi, a revered Carmelite mystic, was one of torment, yet in a close examination of her case one tends to agree with Dr Eric Dingwall, whose researches led him to believe that she was a 'classic example of the ascetic female flagellant and masochistic exhibitionist with a sadistic streak.' In between her raptures were intervals in which she keenly felt the 'temptations' of her body and would resort to rolling in thorn bushes or whipping herself with nettles for distraction. She soon believed she was being attacked – even sexually assaulted – and would swipe at the air about her, throw stones at her invisible assailants, or convulse on the ground reacting to unseen blows. Naturally the Devil was blamed, obviously being outraged by her sanctity. St Mary's initiating vision came in 1585, in which, it is said, St Augustine wrote upon her heart, in crimson letters, *Verbum caro factum est* ('The Word was made Flesh'); eight days later, in another rapture, Christ offered her his crown of thorns, and she exchanged hearts with him. Thereafter her stigmata were in perpetual evidence and she was constantly fainting with pain or swooning in ecstasy. Most stigmatics have similar visions in which Christ himself invites them to share his suffering.

The variety among stigmata deserves a study in itself. St Catherine of Ricci (who died in 1590), St Gemma Galgani and others sometimes had deformed shoulders, and complained of the pain and great weight of an invisible cross. In the 13th century Helena Brumsin bore savage scourge marks, as did Anne Catherine Emmerich nearly 600 years later. Archangela Tardera similarly suffered during a vision in 1608, which left her blind several years before her death, and her stigmata and the scourge marks were still visible on her undecayed body many years later (see page 774). St Catherine of Siena bore her stigmata invisibly, though she felt the pain for five years until her death in 1380, when they finally became visible. The wounds could still be seen when her incorrupted corpse was 'translated' and different parts of

her were sent all over Europe as relics. The wounds of St Mary Francis of the Five Wounds (who died in 1791) completely perforated her hands, and her confessor more than once poked his finger right through them. And like several other stigmatics Magdalena de la Cruz, who was stigmatised for 39 years until her death in 1560, was also seen levitating.

Perhaps the most famous female stigmatic of the 20th century is Teresa Neumann. Like St Gemma, she came from a poor background and took up menial work until mysterious illnesses incapacitated her. In 1926, when she was 28, her afflictions were spontaneously cured after a vision that left her stigmatised. For 32 years she gushed blood from hands, feet, side and forehead during most Fridays – sometimes losing as much as a pint (0.5 litre) of blood and 8 pounds (3.6 kilograms) in weight. Yet she was back to normal by Sunday. For most of this time she was under medical supervision, in the Bavarian village of Konnersreuth, and was also watched closely by the Bishop of Ratisbon. Doctors examined her thoroughly – taking advantage of her trances and periods of unconsciousness – and frequently described the appearance of wounds with the nail-like formations first seen in St Francis of Assisi. One observer noted that, as the years went by, wounds that had been on the backs of her hands developed instead in the palms.

According to Johannes Steiner's biography of Teresa Neumann, which was published in 1967, and which includes photographs of her unique rectangular hand wounds, no food or liquid – except the Communion wafer and wine – passed her lips for the last 35 years of her life, and many

Above: Teresa Neumann, the poor Bavarian whose mysterious illnesses were banished when she was stigmatised in 1926. Every Friday until her death in 1962 she suffered Christ's Passion; wounds appeared in her hands, sides and forehead. She lost weight yet she was always back to normal every Sunday. She also spoke in Aramaic during trances and is said to have taken no food for 35 years

Left: St Francis of Assisi was stigmatised immediately after his vision of a winged seraph. The first recorded stigmatic, this 13th-century saint exhibited nail-like formations – apparently made of toughened sinew – protruding from the wounds in his feet

experiments by different doctors confirmed this astonishing fact. Moreover, her excreta ceased after 1930 and her intestinal tract simply withered – yet despite this she remained fairly active, having ecstasies and visions right up to her death in 1962.

Cases of stigmata continue to be reported. Of the many that could be mentioned, two are of special interest. The first is that of little Cloretta Robinson, who was 10 when she was stigmatised for 19 days over Easter in 1972. She was studied by two psychiatrists, who reported in *General Psychiatry* (May 1974) that they had seen drops of blood oozing through a discoloured patch of skin on her palms when they put her hands under a microscope. Although her marks did not return, this case is especially remarkable, because not only is Cloretta a normal American girl – she is no brooding mystic – she is also the first known black and non-Catholic stigmatic.

The other case is that of Teresa Musco, who died in 1976. As reported in *National Enquirer* of 11 January 1977, she was a poor Italian seamstress who accurately predicted she would die, aged 33 – the same age as Christ. She was stigmatised in a vision in 1969, and though normally illiterate and poorly educated, in her trances she would both speak and write Aramaic (the Semitic language spoken by Christ and the Apostles). Her hands were completely pierced. In her presence, a statue was once seen to weep blood (see page 821), and her corpse (although it was later to decay) was free of rigor mortis for nearly a week after her death. Inevitably a movement has started to petition the Vatican to make this simple and devout woman a saint.

A sign of grace, work of the Devil – or just plain fraud? See page 866

Turning in the grave

The mysterious movement of lead-cased coffins in a sealed tomb in Barbados in the 19th century was believed by many to be the work of some supernatural force. What really happened? GRAHAM FULLER and IAN KNIGHT report

THEY SAY the dead tell no tales. And since the corpses interred in a Barbadian graveyard vault early last century were, apparently, the only human agencies present when the actual coffins they were laid in moved, there naturally exists no immediate first-hand account of this eeriest of mysteries.

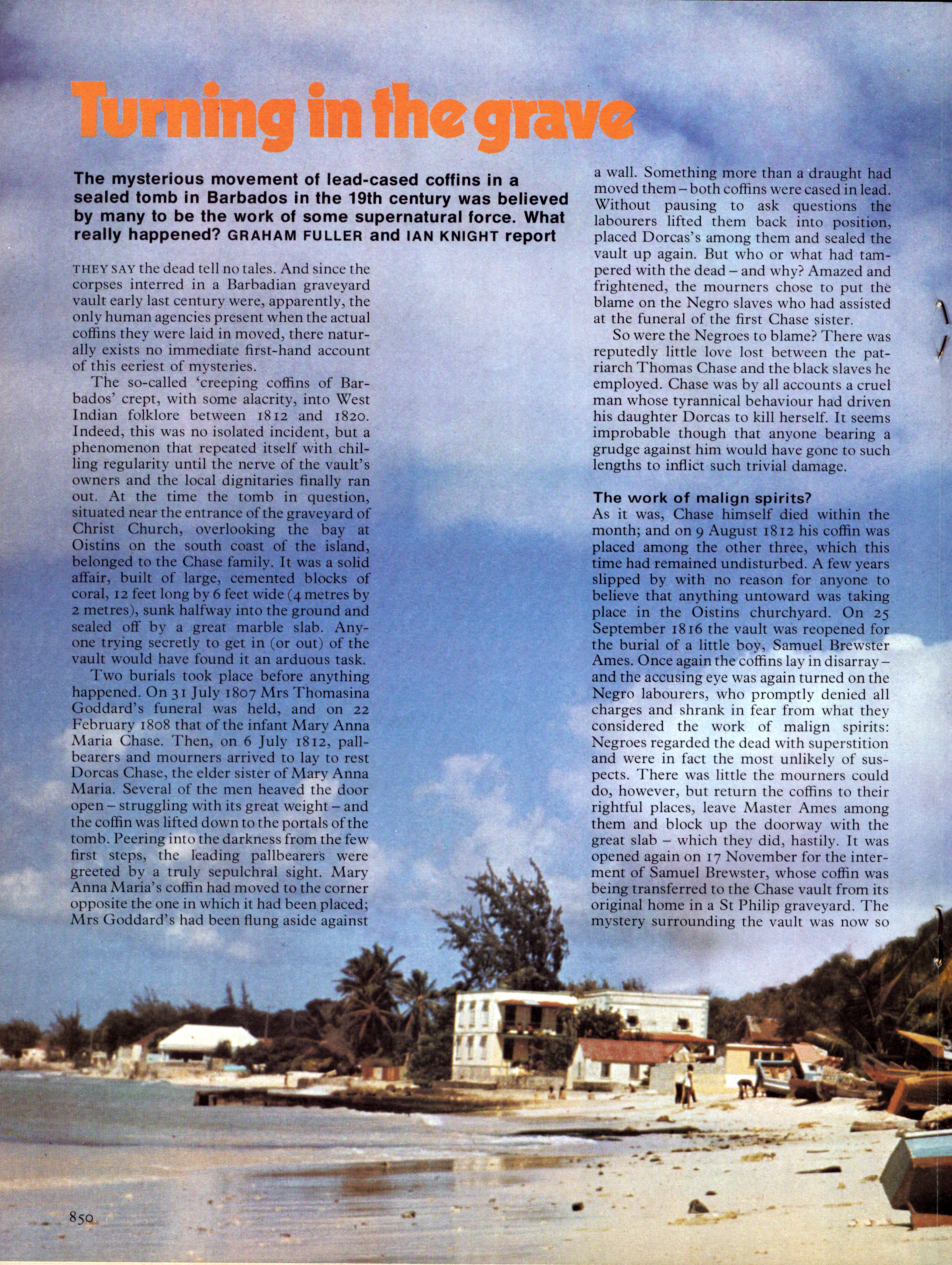
The so-called 'creeping coffins of Barbados' crept, with some alacrity, into West Indian folklore between 1812 and 1820. Indeed, this was no isolated incident, but a phenomenon that repeated itself with chilling regularity until the nerve of the vault's owners and the local dignitaries finally ran out. At the time the tomb in question, situated near the entrance of the graveyard of Christ Church, overlooking the bay at Oistins on the south coast of the island, belonged to the Chase family. It was a solid affair, built of large, cemented blocks of coral, 12 feet long by 6 feet wide (4 metres by 2 metres), sunk halfway into the ground and sealed off by a great marble slab. Anyone trying secretly to get in (or out) of the vault would have found it an arduous task.

Two burials took place before anything happened. On 31 July 1807 Mrs Thomasina Goddard's funeral was held, and on 22 February 1808 that of the infant Mary Anna Maria Chase. Then, on 6 July 1812, pallbearers and mourners arrived to lay to rest Dorcas Chase, the elder sister of Mary Anna Maria. Several of the men heaved the door open – struggling with its great weight – and the coffin was lifted down to the portals of the tomb. Peering into the darkness from the few first steps, the leading pallbearers were greeted by a truly sepulchral sight. Mary Anna Maria's coffin had moved to the corner opposite the one in which it had been placed; Mrs Goddard's had been flung aside against a wall. Something more than a draught had moved them – both coffins were cased in lead. Without pausing to ask questions the labourers lifted them back into position, placed Dorcas's among them and sealed the vault up again. But who or what had tampered with the dead – and why? Amazed and frightened, the mourners chose to put the blame on the Negro slaves who had assisted at the funeral of the first Chase sister.

So were the Negroes to blame? There was reputedly little love lost between the patriarch Thomas Chase and the black slaves he employed. Chase was by all accounts a cruel man whose tyrannical behaviour had driven his daughter Dorcas to kill herself. It seems improbable though that anyone bearing a grudge against him would have gone to such lengths to inflict such trivial damage.

The work of malign spirits?

As it was, Chase himself died within the month; and on 9 August 1812 his coffin was placed among the other three, which this time had remained undisturbed. A few years slipped by with no reason for anyone to believe that anything untoward was taking place in the Oistins churchyard. On 25 September 1816 the vault was reopened for the burial of a little boy, Samuel Brewster Ames. Once again the coffins lay in disarray – and the accusing eye was again turned on the Negro labourers, who promptly denied all charges and shrank in fear from what they considered the work of malign spirits: Negroes regarded the dead with superstition and were in fact the most unlikely of suspects. There was little the mourners could do, however, but return the coffins to their rightful places, leave Master Ames among them and block up the doorway with the great slab – which they did, hastily. It was opened again on 17 November for the interment of Samuel Brewster, whose coffin was being transferred to the Chase vault from its original home in a St Philip graveyard. The mystery surrounding the vault was now so



well-known that a crowd gathered in anticipation of fresh disturbances.

It was not to be disappointed. All of the coffins had shifted ground. That of Mrs Goddard, who had been lying in 'rest' now for nearly a decade, had finally given up under the strain and fallen apart. An exhaustive search of the vault proved futile – the walls, floor and roof were as solid and unyielding as ever. And yet for the third time there were unmistakable signs of violent activity within. Would it happen again? One wonders with what sense of dreadful, resigned foreboding the mourners repositioned the coffins (tying and bundling the remnants of Mrs Goddard's against the wall) and cemented the great door back into place.

Nearly three years passed before the vault was opened again – during which time it received thousands of curious visitors. On 17 July 1819 the funeral of Thomasina Clarke took place. It seems that the mystery was now a major national issue, for Viscount Combermere, the Governor of Barbados, and two of his officials attended the funeral. In front of hundreds of hushed spectators the marble slab was cut free by masons and dragged aside by a team of slaves. Inside, all was chaos; every coffin had moved save only the shattered fragments of Mrs Goddard's, which had remained in their little pile. The vault was searched again. Nothing. Not one clue. Undeterred, the labourers lugged the coffins back. Sand was then sent for and sprinkled over the floor of the tomb so that it formed a smooth, thick carpet that would surely show the traces of the mysterious coffin mover. Once the door was replaced Combermere left the impression of his seal in the cement and others did the same.

No recently deceased Barbadian was brought to the vault when it was opened again on 18 April 1820. Public speculation and excitement about the strange goings-on had mounted to such a degree that no one had the patience to wait for someone to pass on before the mystery could be finally solved or abandoned. After prolonged debate that could lead to only one conclusion, Viscount Combermere, the Honourable Nathan Lucas, Major J. Finch (secretary to the Governor), Mr R. Bowcher Clarke and Mr Rowland Cotton journeyed to Christ Church, collected the Reverend Thomas Orderson and repaired to the graveyard with a band of quaking Negro labourers.

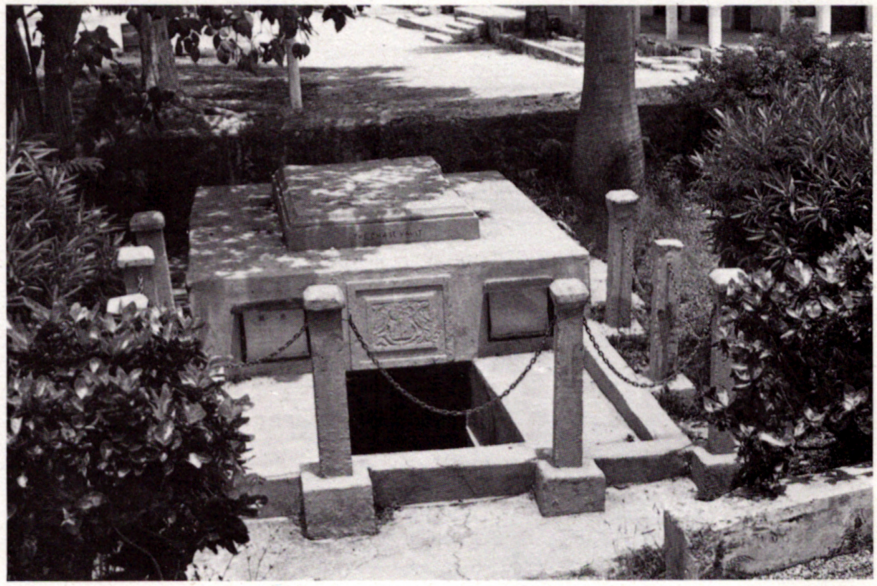
The seals on the cement were intact – no one had therefore since removed the door and entered that way. And from the outside the vault was as solid as ever. Combermere ordered the cement to be chipped away and the huge slab was dragged aside, causing a strange, grating noise. This was the result of one of the larger lead coffins having been thrown up against the door, against which it now lay. Mary Anna Maria's tinier coffin, meanwhile, had been sent flying to the far end of the vault with such violence that it had damaged the coral wall. The other coffins

The bay at Oistins on the south coast of Barbados received thousands of visitors in the years between 1812 and 1820. The tourists flocked to Christ Church graveyard to see at first hand the vault of the Chase family where, it was rumoured, someone – or something – was tampering with the dead

were scattered about, but there were no tell-tale marks in the sand to suggest what might have moved them. The Honourable Nathan Lucas, reporting the incident, had this to say:

> I examined the walls, the arch, and every part of the vault, and found every part old and similar; and a mason in my presence struck every part of the bottom with his hammer, and all was solid. I confess myself at a loss to account for the movements of these leaden coffins. Thieves certainly had no hand in it; and as for any practical wit or hoax, too many were requisite to be trusted with the secret for it to remain unknown; and as for negroes having anything to do with it, their superstitious fear of the dead and everything belonging to them precludes any idea of the kind. All I know is that it happened and that I was an eye-witness of the fact!!!

Whatever, or whoever, it was that caused the coffins in the Chase vault to wander between those four walls was given no further opportunity to do so. All of the coffins were lugged out and given more peaceful resting places elsewhere in the churchyard. The vault remains open and unused to this day.



The entrance to the Chase vault in Christ Church graveyard, Oistins. The vault has stood open and empty since 1820, when all the coffins it contained were removed and buried in another, more peaceful, place

'Werewolves and vampires'

There have been other cases of coffins refusing to stay put. Discussing the Barbados mystery in his book *West Indian tales of old*, Sir Algernon E. Aspinall makes reference to the *European Magazine* of September 1815, which cites a vault at Stanton in Suffolk, England, where on at least three separate occasions, and, as at Oistins, behind a sealed door, coffins had moved off their raised biers; during one of these 'manoeuvres' the heaviest coffin – another eight-pallbearer affair – had climbed onto the fourth step of the vault. 'Whence arose this operation, in which it was certain that no-one had a hand?' asked the *European Magazine* writer. Needless to say, the people of Stanton were as shocked as the Barbadians. In 1867 Mr F. C. Paley, son of the rector of Gretford, near Stamford in Lincolnshire, England, wrote to *Notes and Queries* concerning the repeated movement of heavy lead coffins (also cased in wood) in a local vault; his letter was corroborated by a witness who commented that some of the coffins had moved to a leaning position against the wall.

The superstitious people of Arensburg on the Baltic island of Oesel immediately blamed vampires and werewolves when similar trouble occurred in the town cemetery in 1844. The crisis started in June with the 'spooking' of horses belonging to visitors to the graveyard. Some of these horses bolted, others fainted or dropped dead; many, so the story goes, went mad. The fault was laid at the door of the Buxhoewden family vault. When a funeral service in the family chapel was interrupted by eerie sounds from the adjacent burial chamber, the bravest of the Buxhoewdens entered the tomb to find that the coffins of their late relatives had been thrown around. Rumours of 'devilry' spread and there was great fear and consternation in Arensburg. The president of the local ecclesiastical court, the Baron de Guldenstabbé, headed an official enquiry and personally visited the vault, which had been put back in order and locked. The coffins had moved again.

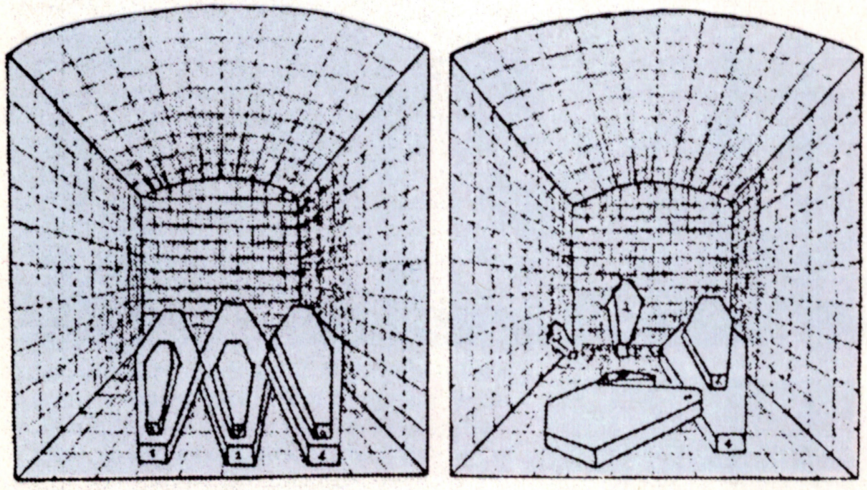
Viscount Combermere, the Governor of Barbados, supervised the sealing of the Chase vault after the funeral of Thomasina Clarke on 17 July 1819. When he returned nine months later to check on the state of the tomb he found the coffins in total disarray – and yet the seals on the door had remained intact

Determined to get to the bottom of the mystery, the Baron set up a committee to investigate it. They went further than their Barbadian cousins and had the floor of the vault ripped up, hoping, in vain, to find a secret passage. They suspected ghouls, though none of the coffins had in fact been robbed. Forced to give up their fruitless search, the committee laid not sand but ash throughout the vault and chapel and, as at Oistins, left secret seals that would break if the door were opened by any means. For three days and nights the place was guarded by soldiers. Then the committee returned: the seals were unbroken, the ashes were untouched and the coffins were everywhere they shouldn't have been – some standing on their heads, one so badly cracked that a bony arm protruded from it. Lacking the patience of the Barbadians who had put up with this sort of thing for eight years, the Arensburg committee and the Buxhoewdens immediately had the coffins moved elsewhere and put an end to the vault's activities.

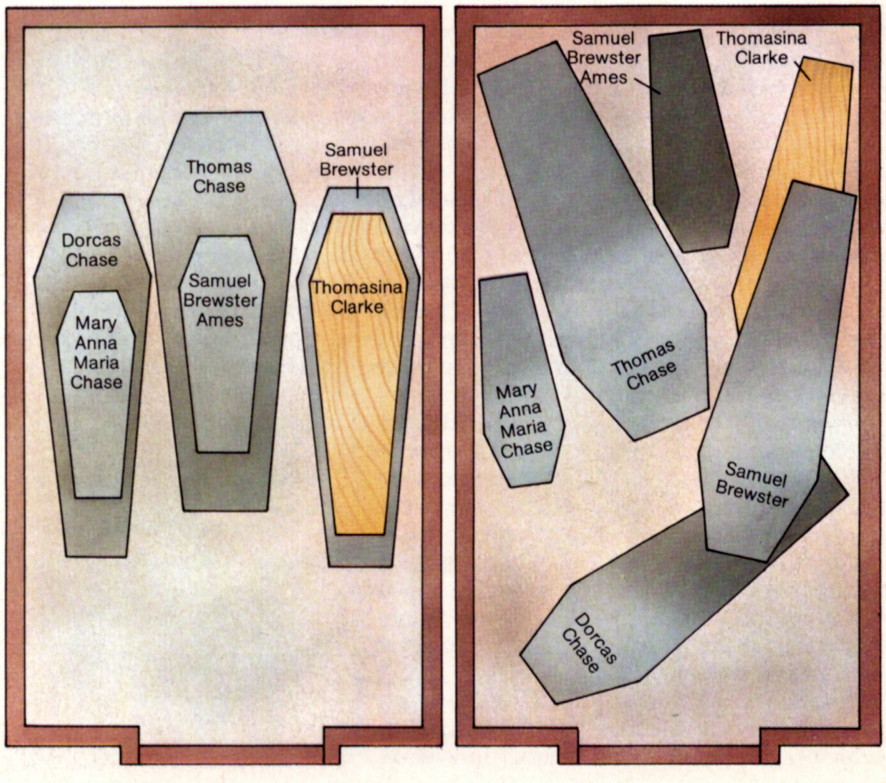
What causes coffins to move about, whether they are in vaults in Barbados, in England or on an island in the Baltic Sea? There is no ready explanation. The 'traps' set up by the various investigators – the secret seals and the sand or ash covered floors – strongly indicate that no human villains are involved. That in Barbados it was malevolent Negro slaves – or the malevolent spirits suspected by the Negroes themselves – seems implausible. Among those who have

considered the supernatural and paranormal possibilities are Sir Arthur Conan Doyle, who believed that the Oistins coffins moved because of the strange physical powers that are supposed to reside in the bodies of the prematurely dead – like the young Chase girls and Samuel Brewster Ames. There is more credence in the theory proffered by George Hunte, author of *Barbados*, who suggests that 'gas from decomposing bodies and not malevolent spirits was responsible for the violent separations and disarray of the sober arrangements which were made by undertakers'.

What about water in the vaults? Could the coffins have floated? The Chase vault was not only watertight but high and dry too; underground currents can be ruled out. The man who confirmed Mr Paley's letter about the Gretford coffins believed they floated into their strange positions when the vault was flooded – but there is no evidence that it ever was. Since the events at Arensburg all took place within a few weeks, any sign of flooding would have been noticed; none was. Lead coffins *can* float – they need something to float on, however.



Below: drawings made by eyewitness Nathan Lucas to show how the coffins were originally placed in the vault (left) and how they were found in April 1820 (right). However, there are discrepancies between the account given by Lucas and those of other witnesses, and a second set of drawings (bottom) – also said to have been made on the spot and at the time the tomb was opened – is generally accepted to be a more accurate portrayal of the arrangement of the coffins



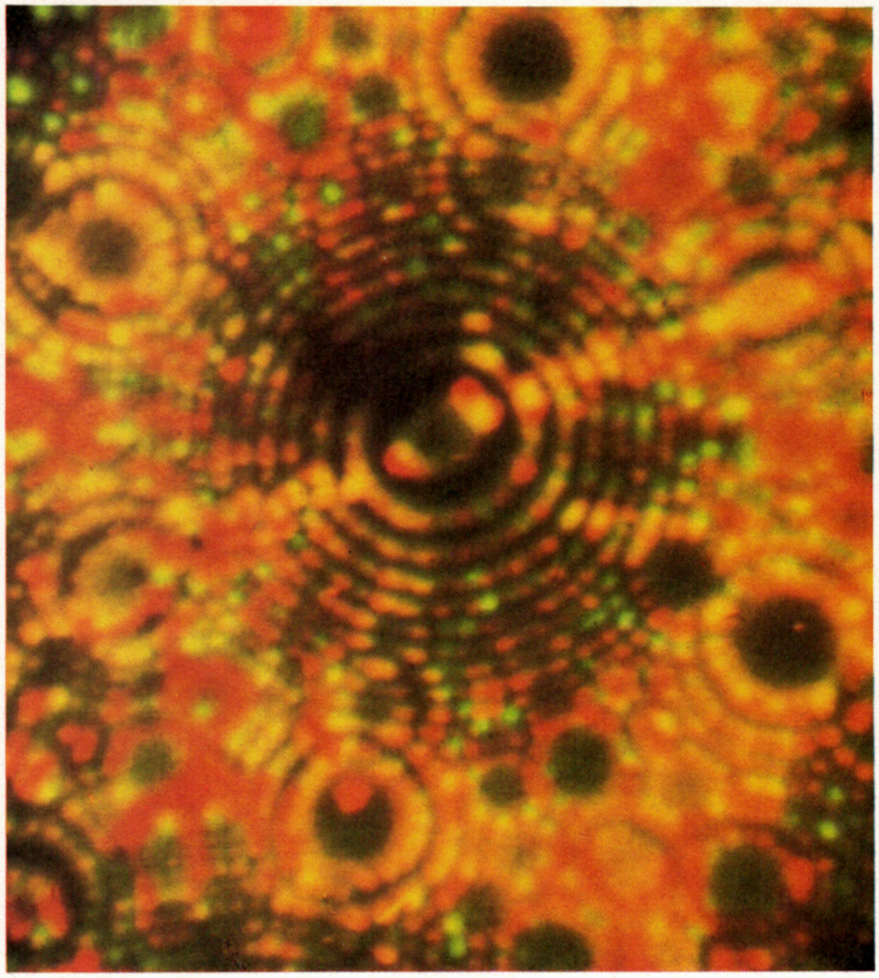
The movements of the Oistins coffins could be ascribed to earth tremors. Barbados lies on a seismic belt and is framed by fracture zones; moreover there is a volcano on the nearby island of St Vincent. The slightest underground tremor could have displaced the coffins – but why only those in the Chase vault? The theory is dubious. Stanton, Gretford and Arensburg are not known for seismic activity.

Most of the coffins in the vault at Barbados were made of lead, so ordinary magnetic forces did not cause the mischief. And yet some such force may provide the answer to the mystery. One vital clue has emerged from the investigations of the Barbadians. At the time of the last burial there in 1819 someone saw fit to make a drawing of the vault in a state of orderliness; and another of its supposedly chaotic appearance when it was opened for the final time in April 1820. Eric Frank Russell compared the drawings in his chapter on the coffin phenomenon in *Great world mysteries* (published in 1957):

> As first placed, three large coffins were put in a neat row with the middle one set slightly further away from the vault's door. Three smaller coffins sat tidily on top of the big ones. All had their feet towards the door, their heads towards the back of the vault, their longitudinal axes parallel to the side walls.
>
> When found out of place all coffins were in varying but fairly regular stages of reversal, their heads now being more or less towards the door, their feet more or less towards the back wall. They look exactly as if caught when rotating at snail's pace around their own centres of gravity, some having twisted farther than others, their axes now cutting through an arc of about 120 degrees. The picture they present is that of a swirl, or a spiral effect, like so many metal shapes, heavier at one end than the other, spun around by some force gravitational, gyroscopic, electromagnetic or goodness knows what.

However inconclusive, Russell's suggestion seems the most plausible. Superstition and fear though – slamming the door shut on the case of the creeping coffins of Barbados and abandoning the vault (as at Arensburg) – precluded further scientific research into the whole weird business, which remains wreathed in mystery. All that is known for sure is that for eight macabre years in the Chase vault at Oistins there were, to adapt the words of Emily Brontë, 'unquiet slumbers for the sleepers in that quiet earth'.

There seems to be no place for 'common sense' in the bizarre new scientific theories of the 20th century. ARCHIE ROY describes the world of modern physics, where time flows at varying rates or even goes backwards, and where matter and antimatter are in constant flux



A photograph of individual atoms. Each spot of light in this picture represents a single atom in the tip of a tungsten needle. The symmetrical patterning of the atoms reflects the crystalline structure of the metal. To make the picture, an intense electric field was applied at the highly sharpened tip of the needle. Electrons were torn from each atom and formed images where they struck the film

The phantom universe

THE LATE-VICTORIAN MODEL of the Universe seemed a steady, reliable and enduring construction. Yet within half a century it was shattered by quantum mechanics and the theory of relativity.

The first suspicions that nature was not as it had seemed came when the Michelson-Morley experiment failed in its attempt to detect the Earth's movement through the luminiferous ether (see page 801). The physicists Hendrik Lorentz and G. F. Fitzgerald suggested an explanation: physical objects had sizes that depended on their speeds – a moving object shrank in the direction of its motion. They also postulated that the measurement of the passage of time by a clock depended likewise on the clock's velocity. The expression 'time flies' took on quite a different meaning! They suggested that the Michelson-Morley null result could be explained by such changes in the measuring apparatus.

Lorentz gave a special mathematical expression that related the space and time measurements made by a moving observer to those made by an observer at rest. Speeds in Man's everyday life are very small with respect to the velocity of light – which is 186,000 miles per second (300,000 kilometres per second) – and so these effects would be unnoticeable. But if light travelled at the speed of, say, a racing car, then even in past centuries people might have taken it as quite normal for arrows and cannonballs to shorten perceptibly in the direction of travel, regaining their former length when they stopped, and for a clock's hands to turn more slowly while it was moving.

Some of Lorentz's ideas appeared, in a different form, in Einstein's theory of relativity, published in 1905. But Einstein went further by denying any distinction between moving and stationary objects. An observer in a high-speed rocket would see an apparent shortening of 'stationary' objects and a slowing down of 'stationary' clocks, just as observers on Earth would see these changes in him and in the rocket.

Einstein showed that this curious velocity effect also altered the mass of an object. As its velocity increased, its mass increased, making the object harder to accelerate. As its speed approached the velocity of light, the mass became enormous. Einstein obtained the result that the velocity of light was a limit that no physical object could reach. Nowadays, physicists are able to accelerate charged particles to within a few per cent of this velocity, at which speeds their masses are observed to be many times their rest mass.

In addition, Einstein assumed that the velocity of light as measured by any observer was a fixed quantity, no matter at what speed the observer moved. This again was contrary to common sense. If two cars, each travelling at 50 miles per hour (80 km/h) as measured by a stationary observer, are approaching each other, we would expect that an observer in one of the cars would see the other as approaching at 100 miles per hour (160 km/h). In fact, as Einstein showed, the relative speed is actually less than this by an infinitesimal amount (see page 42).

Furthermore, if the cars were beams of light, and the speed of light were only 50 miles per hour (80 km/h), then a measurement of its speed would always give that result – no matter what the speed of the

observer. In essence, he would be carrying out Michelson and Morley's experiment, and finding what they found – that no variation in the speed of light is detectable.

Treating space and time as separate and independent quantities was now shown to be mistaken. In 1908 Hermann Minkowski suggested that the concept of 'spacetime' could be used to remove the barriers to our acceptance of such strange effects as these changes in time and size. He claimed:

> Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality.

In Minkowski's conception the Universe is represented as having four dimensions: the three dimensions of space – length, breadth and width – and the dimension of time. The history of a body (a human being, a picture, anything) is represented by a 'world line', mapping its course through space and time from its creation to its dissolution. There is no movement or change in this representation of the Universe. Past, present and future are introduced by human consciousness. The slice of spacetime consciously perceived defines the present moment for the observer. Some theorists have supposed that consciousness travels like a tiny point of light along the observer's world line. Although the four-dimensional block Universe is static and unchanging, he is under the illusion that 'things happen' – rather like the illusion experienced by a driver at night when trees that are actually static seem to appear in the headlamp's beam, rush past and disappear.

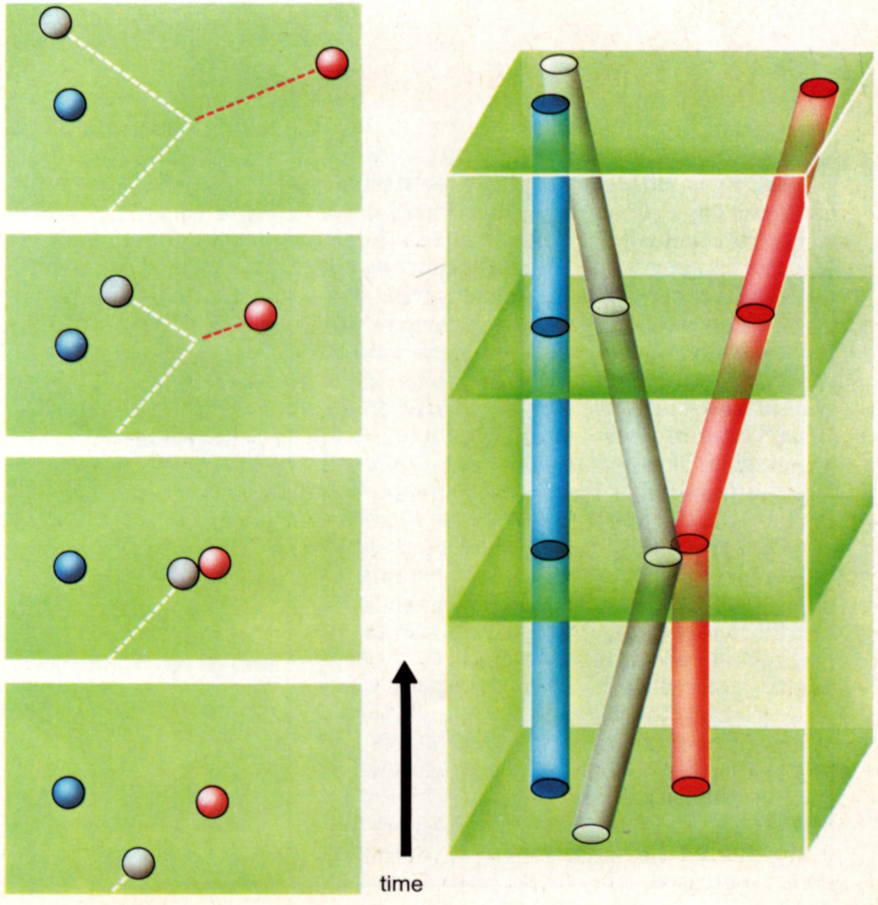
On closer examination this model of space, time and consciousness reveals difficulties, but it remains useful when paranormal phenomena relating to time and consciousness are studied, if only to help the theorist break free from common-sense conceptions or prejudices about such matters.

Into the atom

After the theories of Einstein and Minkowski, still worse assaults on common sense were to follow. J. J. Thomson showed that the electron was an entity with less than a thousandth of the mass of the hydrogen atom. Other experimenters discovered the proton and the neutron. Both had essentially the same mass as a hydrogen atom but, whereas the proton carried a charge equal to that of the electron but of opposite sign, the neutron was electrically neutral. Ernest Rutherford postulated that every atom consisted of a nucleus of protons and neutrons surrounded by a screen of electrons, held in orbit by the attractive force between their negative electrical charges and the protons' positive charges. The electrons circled the nucleus like miniature planets moving round a miniature Sun. Like our solar system, the atom now became largely composed of nothing. If it had been a sphere the size of the Earth, then the nucleus would be a cathedral at its centre, circled by electrons the size of bungalows.

Above: Hermann Minkowski, who conceived 'spacetime'

Below: a snooker game, shown in 'snapshots' (left), from the bottom upwards, and in spacetime (right), in which the vertical dimension represents time. Each object's history is shown by its 'world line'

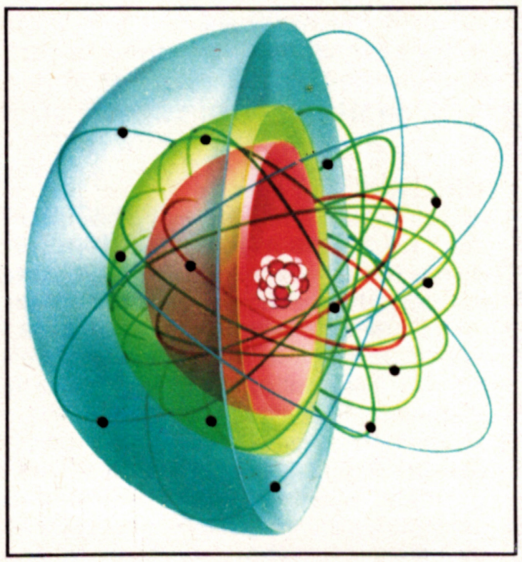


But the Danish theorist Niels Bohr went further. To any orbital radius there corresponded an energy level. Using the long-established idea that in atomic processes energy comes in multiples of a basic energy unit, the 'quantum', he showed that only certain orbits were possible for the electrons in atoms. But the theory gave little insight as to why such limitations should exist in nature. Furthermore, electrons apparently jumped from one orbit to another instantaneously. But even though the theory's assumptions seemed against all common sense, it became accepted because it worked.

Other researchers were now demonstrating additional strange features of these subatomic particles. When an electron collided with another atomic particle, it behaved like a tiny cannonball, but in other experiments electrons behaved as if they were made up of waves, as light is. The electron could equally well be regarded as a wave or as a particle. Sir William Bragg quipped: 'Electrons seem to be waves on Mondays, Wednesdays and Fridays, and particles on Tuesdays, Thursdays and Saturdays.' Perhaps on Sundays they took the day off to recover from their Jekyll and Hyde transformations.

This dual quality of the particles of nature is recognised in Bohr's principle of complementarity:

> The concept of complementarity is



Left: the atom, once thought to be indivisible, has a complex structure. Swarms of electrons, carrying negative electric charge, circle a heavy nucleus consisting of positively charged protons and uncharged neutrons. The electrons follow orbits grouped in 'shells', and are responsible for the atom's chemical properties

Below: Niels Bohr proposed in 1913 that in the atom only certain orbits are 'allowed' for electrons – a restriction that could not then be explained

meant to describe a situation in which we can look at one and the same event through two different frames of reference. These two frames mutually exclude each other, and only the juxtaposition of these contradictory frames provides an exhaustive view of the appearances of the phenomena.

Bohr cited many examples of complementary relationships among ideas from outside physics: for example, moral *judgement* and psychological *explanation* of human actions may be mutually incompatible, yet equally necessary to give a full picture of them. Later we shall discover that the principle of complementarity can be usefully applied to the world of paranormal phenomena.

Werner Heisenberg, who had made crucial contributions to the task of replacing the 19th century's conception of a hard, material Universe by the insubstantial world-web of 20th-century theoretical physics, stated his principle of indeterminacy: that for subatomic entities it is impossible to know their position and velocity simultaneously and exactly. Since subatomic particles are wave-like it is not possible to talk about position in any precise fashion. In fact the equations of theoretical physics refer merely to possibilities or probabilities, not to facts. Henry Margenau said of them:

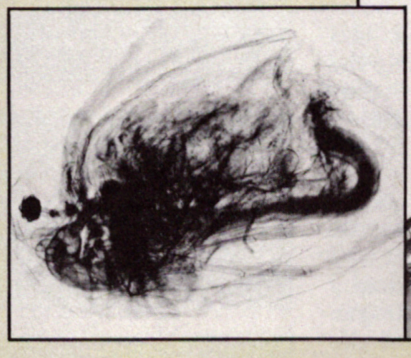
> The equations say nothing about masses moving; they regulate the behaviour of very abstract fields, certainly in many cases non-material fields. . . .

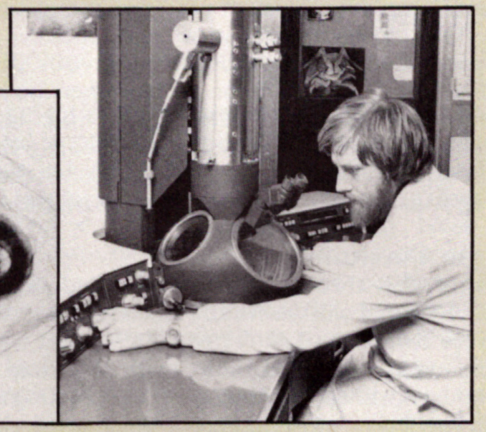
This field theory implies that matter is composed of wave-like processes, that the seemingly solid material Universe perceived by our physical senses is an illusion. In addition, the seeming separateness of objects within that Universe is also an illusion. On the subatomic scale, there are no 'objects' of invariant 'mass' and given 'volume' separated by 'distances' and acting on each other with 'forces' of the simple push-pull type of mechanics. The entity we conveniently call an electron has no definite position at a given time, no definite velocity and no isolation from the rest of the Universe. Quantum theory states that, whatever location is specified, there is a small but finite probability of

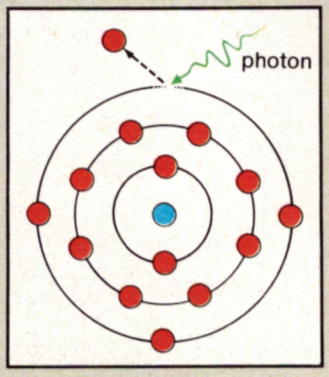
A crisis of identity

One of the triumphs of 19th-century science was the demonstration that light consists of waves. These were explained as consisting of fluctuations in electric and magnetic fields, and their wavelengths were accurately measured. But although the evidence for this view was overwhelming, it could not explain the fact that light waves can knock electrons out of atoms (below right). This 'photoelectric' effect is used in photographers' light meters – the electrons ejected by the light form an electric current, the strength of which indicates the intensity of the light. Even an extremely faint light can eject electrons – a fact baffling to physicists. Albert Einstein, in the same year that he proposed the theory of relativity, suggested that light behaves in this experiment as if consisting of a stream of particle-like 'photons'. This picture accounts for the behaviour of light in some experiments, while in others the wave picture must be used.

The same ambiguity was discovered in what had been regarded simply as particles. The fact that electrons can sometimes behave like waves was demonstrated in 1926. Like the photoelectric effect, this phenomenon has practical uses. One type of electron microscope (above) uses a beam of electrons like a beam of light, focusing it and forming images of an object, such as that of the water flea (above left). The wavelength of the electrons is so short that they can reveal details hundreds of times smaller than those that can be seen with a light microscope.





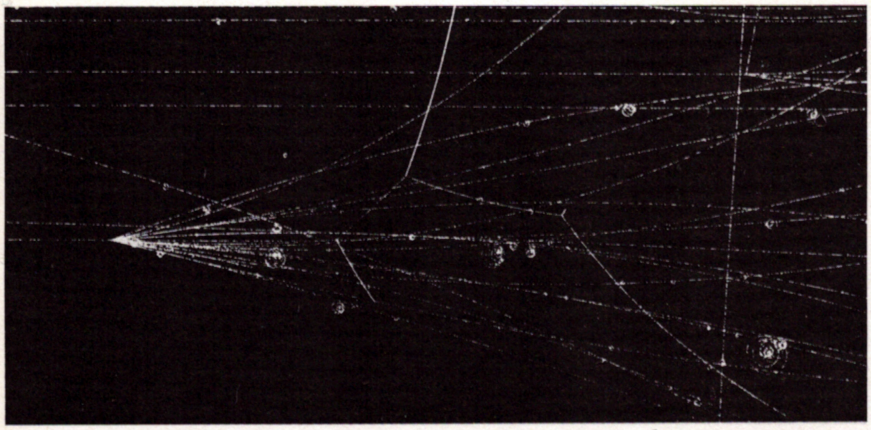


the electron being there. It, and every other subatomic particle, is in some way related to every part of the Universe.

Instinctively we react to these ideas by assuming that the uncertainty in our knowledge of position, velocity, and so on is simply due to the imprecision of our measurements. But this is not so. The uncertainty is built into the microworld because of the nature of subatomic particles.

In countless experiments every day, mass is transformed into energy and vice versa; streams of neutrinos (particles that have no mass, no electric charge, no magnetic field), travelling from remote regions of space, pass through the 'solid' Earth, as if the planet were a ghost; experimenters work with 'antimatter' particles, the mirror opposites of the particles of the everyday Universe.

The existence of one such antimatter particle, the positron, was predicted by the British theorist P. A. M. Dirac in 1931 and confirmed experimentally in 1932 by Carl Anderson. It has the same mass as an electron but is of opposite electric charge. When it meets an electron, both are annihilated, resulting in the creation of high-energy gamma rays. The physicist Richard Feynman proposed that the positron *was* an electron – but an electron moving backwards in time. Certainly the mathematical theory suggested that if an electron could do this it would behave in experiments exactly like a positron. Feynman went further, suggesting that all antimatter particles were ordinary particles travelling backwards in time.



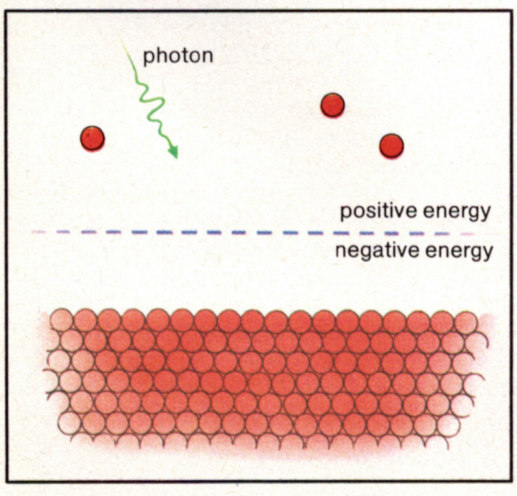
A collision on the subatomic scale. The picture shows events in a bubble chamber, a tank filled with liquid hydrogen. A pion, a short-lived particle, enters at lower left. The hydrogen boils along its path, leaving a track of tiny bubbles. The pion strikes a hydrogen atom's nucleus, consisting of a single proton, which disintegrates to produce a cascade of particles. Their properties are revealed by the length, thickness and curvature of their paths

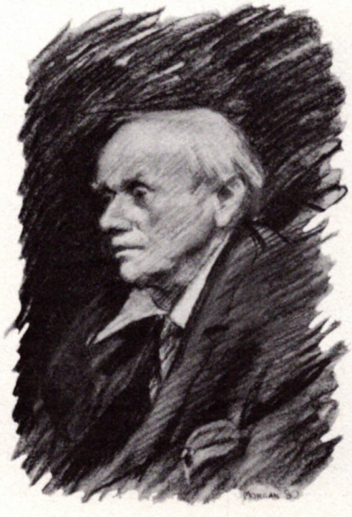
Dirac had been led to his prediction from his study of the solutions of the quantum-mechanical equations that he himself had proposed. For every solution he found describing an electron of given energy, there was another one predicting an electron with negative energy of equal amount – no matter how large. But if these negative energy states existed, why did electrons not fall into these bottomless pits of negative energy, causing atoms to collapse and the Universe to be annihilated in one blaze of radiation? Dirac suggested that all the negative energy states were already occupied by an infinite 'sea' of electrons. Now Pauli's 'exclusion principle' states that two electrons cannot occupy the same energy niche; so, with all possible negative energy states filled, ordinary electrons are kept in existence.

Normally this infinite electron 'sea' is no more perceptible in atomic processes than the air around us is perceptible to our senses. On occasion, however, a negative-energy electron can acquire enough energy to climb out of its 'hole' in Dirac's sea. To the observer it then simply materialises as an ordinary electron. But the hole in the sea also becomes manifest, as an electron of positive electric charge – the anti-particle that Dirac had predicted, the positron.

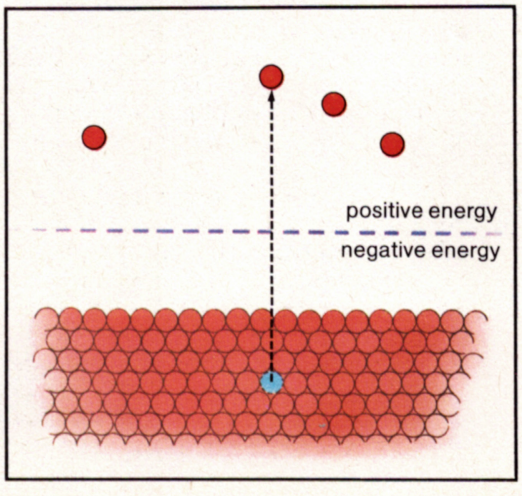
Such paradoxical concepts have given Man the insight to manipulate the microworld, split the atom and, ultimately, create nuclear power stations. Emulating the legendary Prometheus, who stole fire from heaven, he now attempts in his fusion experiments to bring down to Earth the energy-releasing processes of the stars themselves. Some parapsychologists hope that our modern quantum-mechanical understanding of the Universe will inspire similarly fruitful theories in the equally strange field of the paranormal.

On page 894: the uncanny resemblance between the theories of modern science and the claims of psychics and mystics



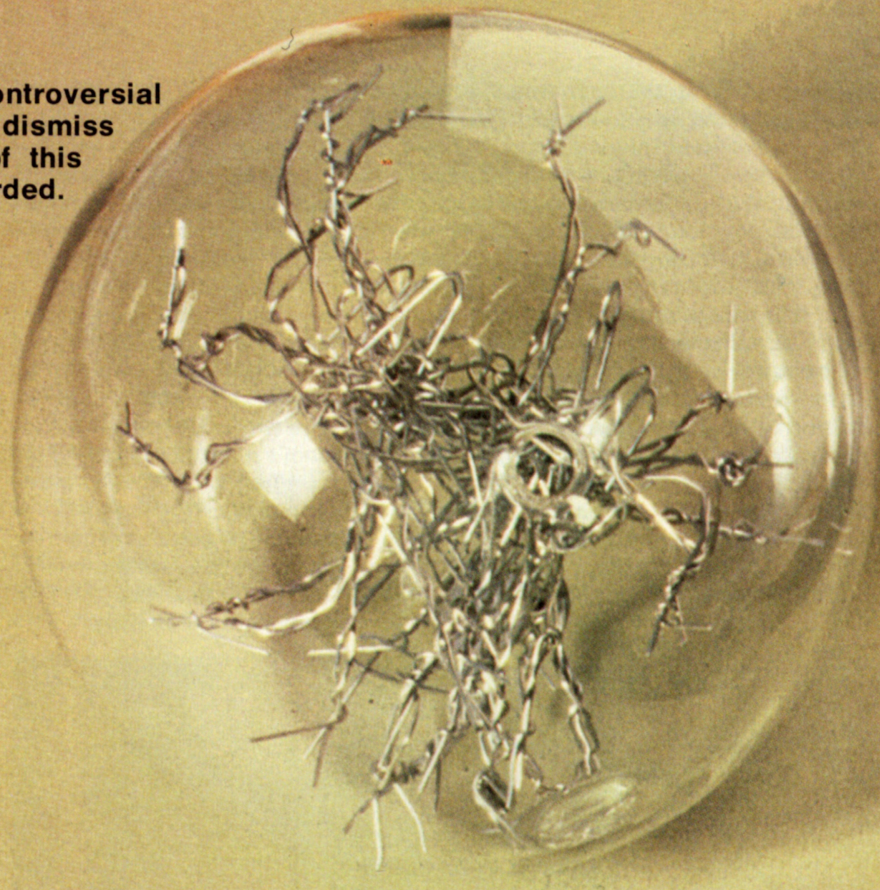


Below: P. A. M. Dirac suggested the existence of a 'sea' of unperceived electrons of negative energy (left). Ordinary electrons have positive energy. A photon of very high energy can knock an electron from the 'sea' (right). The electron appears to be created, together with a 'hole' in the sea – an anti-electron, or positron



Mind over metal

Few paranormal effects are as controversial as metal bending. But while sceptics dismiss it as fraud or delusion, examples of this bizarre power continue to be recorded. GUY LYON PLAYFAIR tells the story

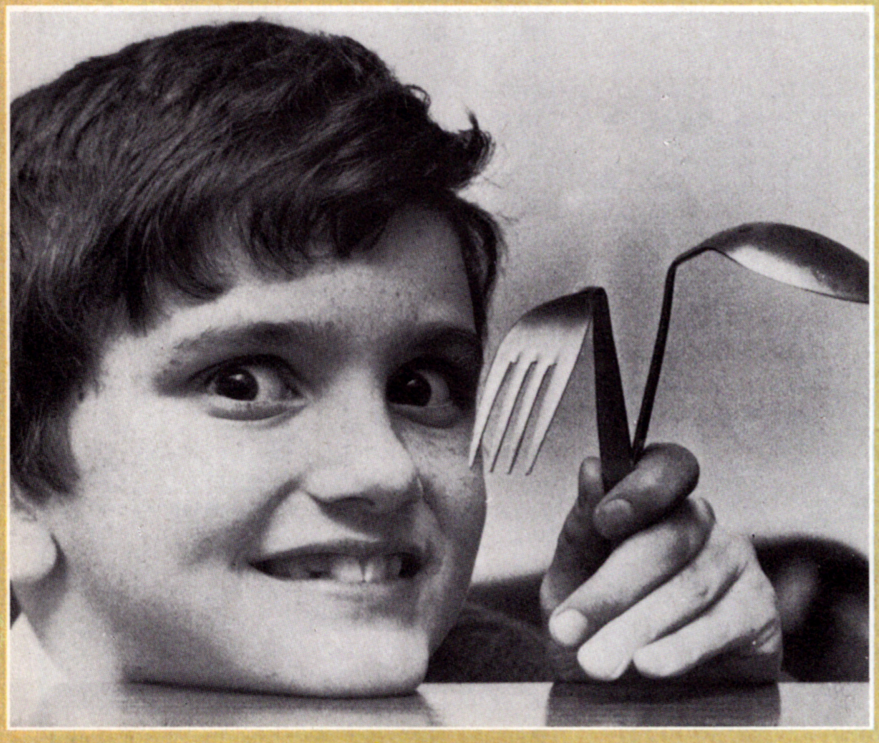


Paperclips dropped into this glass ball were paranormally 'scrunched' into a fantastic shape by one of Professor Hasted's metal bending subjects

ACCOUNTS OF INEXPLICABLE contortions of metal objects date back at least to the 18th century, when pins were found twisted into 'a vast variety of fantastic figures' during a poltergeist case, while in 1879 victims of an American case reported that spoons 'suddenly twisted out of shape' in their hands. But it was not until 1972, with the arrival of Uri Geller on the international scene, that paranormal or psychokinetic metal bending (PKMB) – the influencing of metal apparently by mind power alone – became a field of study in its own right.

Over the next four years Geller took part in supervised experiments in 17 different laboratories. Dr George Owen of the New Horizons Research Foundation in Toronto pronounced his abilities as 'paranormal and totally genuine', while Eldon Byrd of the US Navy research centre in Maryland stated that Geller had bent metal under observation 'in a way that cannot be duplicated'. Five professional magicians testified that, despite allegations to the contrary by their colleague James Randi, whatever Geller was doing, it was not conventional stage magic.

After Geller's first television appearance in Britain in 1973, an epidemic of PKMB broke out in homes over the whole country, especially affecting young children and teenagers. For some it was a new game soon forgotten (as annoyed parents ran out of usable cutlery), while other children were encouraged to work at it. In 1974, 18-year-old Matthew Manning, then coming to the end of his period as a poltergeist victim, put on a spectacular display of PKMB in front of 21 scientists, including Nobel Laureate Professor Brian Josephson, and enabled psychiatrist Dr Joel Whitton to identify a hitherto unknown brainwave pattern apparently linked to paranormal activity.



But the first scientist to commit himself to a thorough and long-term enquiry into PKMB was Professor J. B. Hasted, head of the physics department of Birkbeck College, London, who carried out a series of tests with several young subjects, both in his laboratory and in the children's homes. Although in the course of his investigations he introduced more rigidly conventional methodology, he soon realised that successful PKMB depends on many other, more subtle factors: for example, the psychological atmosphere in the laboratory was crucial, the state of mind of both subject and experimenter being a decisive factor. Metal benders, he discovered, had to be treated as *colleagues* rather than as guinea-pigs. In an article he co-authored in *Nature* (10 April 1975), he declared that 'psychokinetic phenomena cannot in general be produced unless all who participate are in a relaxed state.' PKMB was, he assumed, a function of the unconscious mind, and too much conscious effort would upset the process, as would an atmosphere of tension, scepticism or hostility. The PKMB

researcher should, he argued, adopt the attitude of a physiotherapist encouraging a patient to regain the use of a damaged limb, rather than telling him it could not be done.

The possibility of trickery had to be eliminated, and to this end Hasted devised experiments in which the metal object was attached to a strain gauge and a chart recorder. And (most important) the subject was not allowed to touch the metal at all. Three of his young colleagues were soon able to produce stress signals on the chart paper under these conditions, signals quite unlike those produced when metal is bent by normal physical force.

'Impossible' tasks

Next, Hasted set his subjects a series of 'impossible' tasks, such as the 'scrunching' together of straightened paperclips inside a glass sphere and the bending of alloy strips that snap rather than bend under normal stresses. Again, the young subjects responded to these challenges, producing a number of remarkable scrunches, while one managed to deform four strips of 'unbendable' alloy merely by leaving them, untouched, in his coat pocket for five minutes. By December 1976, Hasted was able to state categorically, in the *Journal* of the Society for Psychical Research (SPR): 'I therefore report my belief that I have been able to validate the metal-bending phenomenon on a number of occasions by visual witnessing, chart-recording, "impossible" tasks and the bending of brittle metals.'

The following year, in the same journal, he described a series of 13 tests held with 17-year-old Nicholas Williams, the highlight of which was the chart recording of simultaneous strain signals from three different keys hanging from wires, and even from two metal objects 10 yards (9 metres) apart on different floors of the building. Eventually, Hasted was able to add some sequences of videotape to his evidence, in which metal objects can be seen bending without being touched. The PKMB phenomenon had, it seemed, been well and truly validated.

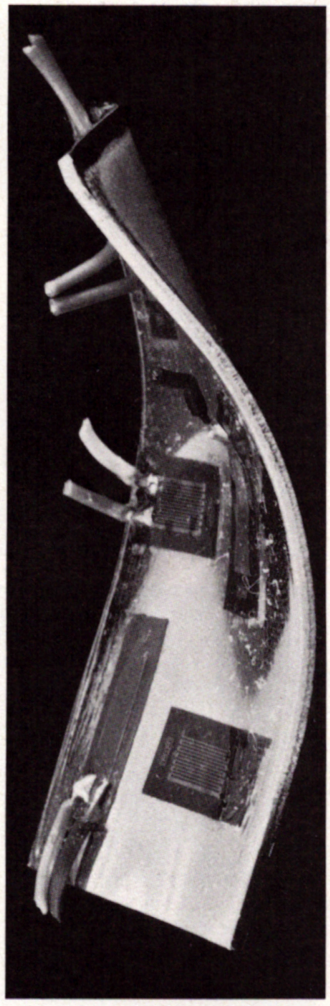
It had also been repeated in several other countries, under the supervision of qualified researchers. At the Péchiney Laboratory in France, metallurgists Professor Charles Crussard and Dr Jean Bouvaist published a detailed report on the abilities of Jean Pierre Girard, the most thoroughly studied of all metal benders. They found that he could induce both anomalous hardening and softening in metal in a manner impossible to explain in terms of conventional metallurgy. Girard, who was born in 1942, developed numerous psychic abilities shortly after being struck by lightning as a child.

He made his début as a metal bender in 1975, in response to a radio appeal from Dr William Wolkowski for people with psi abilities to come forward. He successfully distorted a number of metal samples, including a steel spring, sealed inside glass tubes under Wolkowski's supervision. In one of his most dramatic demonstrations of PKMB, he bent a 3-inch (8-centimetre) screw inside a plastic tube held by Swedish physicist Dr Georg Wikman in about 15 seconds, without touching either the screw or the tube.

In West Germany, Professor Hans Bender of the University of Freiburg studied Girard with the co-operation of William Cox – well-known parapsychologist and magician – and a cameraman, and became one of the first to record PKMB on film. Girard produced more than 10 distinct bends under close scrutiny, but in fairly informal conditions. (Two French magicians, Ranky and André Sanlaville, have testified that his effects are not produced by conventional sleight of hand.) By 1977, Girard had demonstrated his abilities in front of at least 16 scientists.

Professor Bender also filmed an adult Swiss, Silvio Meyer, as he bent several spoons by PK alone, breaking some of them in the process, and also bending several heavy forks *upwards* while holding each lightly with only one hand. Meanwhile, in Japan, several children developed PKMB talents after Geller's visit to Tokyo in 1973, and two of them – Masuaki Kiyota and Jun Sekiguchi – were studied at length by several scientists, notably Professor Shigemi Sasaki of the Department of Electro-Communications, Tokyo University, and Dr Matsumi Suzuki of the Aeronautical Instruments Research Institute.

As the evidence from laboratories all over



Above: a metal bar fitted with strain gauges and then bent paranormally in Professor Hasted's London laboratory. A chart recorder was also attached to the metal and, to eliminate the possibility of trickery, the subjects were not allowed to touch the metal. It still bent, showing stress signals unlike those produced when attempts were made to bend the bar manually

Right: Professor John Hasted checks strain gauge equipment in the laboratory

Far left: seven-year-old Mark Shelley bent a spoon and fork after seeing 'that man' – Uri Geller – on television in October 1973. He went on to prove his new skill on more household cutlery before tiring of metal bending. He said: 'It seems a waste of time going around the world like this. I'd rather play football for Ipswich'

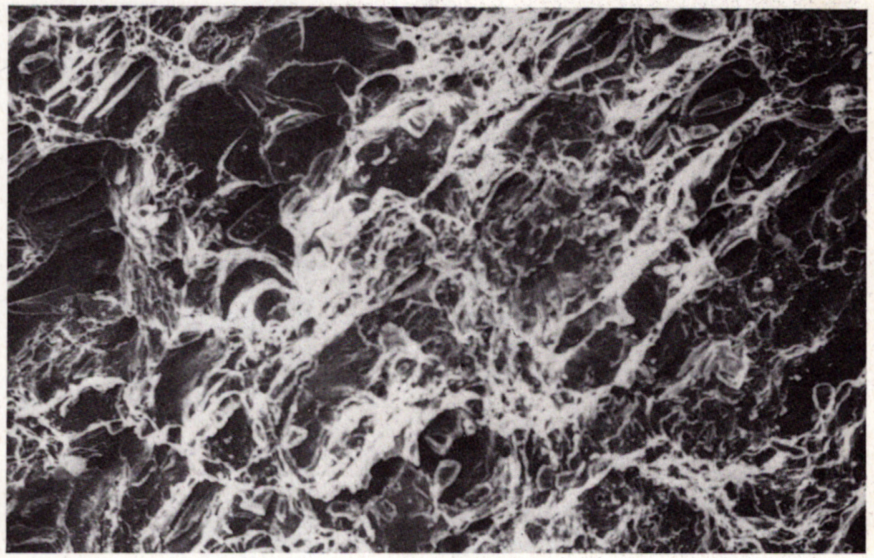
the world mounted up, support came from theoretical physicists who found that not only was 'action at a distance' permitted according to the laws of quantum physics, but it could actually be predicted. At a conference on 'Frontiers of Physics' held in Iceland in 1977 it became clear, amid talk of 'collapsing wave functions', 'intrinsic time symmetry' and 'additivity of partial amplitudes', that the human mind had been willingly accepted as a potential influence on physical processes. PKMB had become almost respectable.

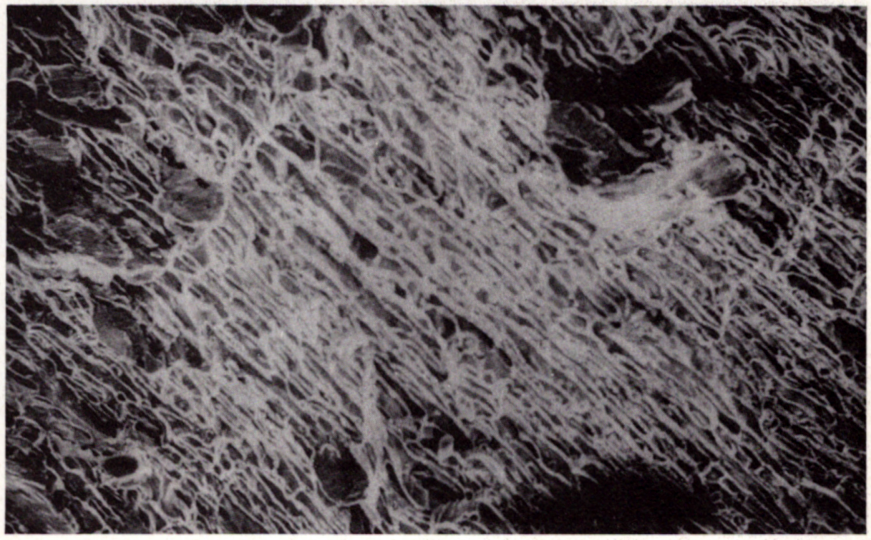
The phenomenon has also come to the attention of psychiatrists, and in a lengthy study of young metal benders and their families, Dr Robert Cantor found that most youngsters also showed other paranormal abilities, from telepathy and clairvoyance to healing. Some had also seen tiny lights moving around them, and heard high-pitched whistles. Others reported experiencing headaches while concentrating on bending metal (as did some of their investigators), plus tingling sensations in the arms and face. Cantor also found that PKMB seemed to have no harmful effects, and actually served to increase the children's self-confidence. Most encouraging of all was the fact that all children he questioned insisted that their powers must be used for good. If misused, they felt, they would lose them. The experience of one of them serves as an answer to the often-asked question: 'Who needs bent spoons anyway?'

Belinda H. was only six when she responded to Uri Geller's invitation to bend metal during the transmission of BBC-TV's *Blue Peter* programme. She deformed a spoon through 40° in less than a minute, and later bent an 'unbendable' crystal in the presence of Professor Hasted. (She looked set to win the *Daily Express* £5,000 metal-bending contest until this was mysteriously cancelled.) However, Belinda was more interested in healing. When she was only three years old she had spontaneously tried to cure her ailing grandmother, and on three other occasions she satisfied both her parents that she had been able to relieve severe pain by placing her hands on the affected parts of their bodies.

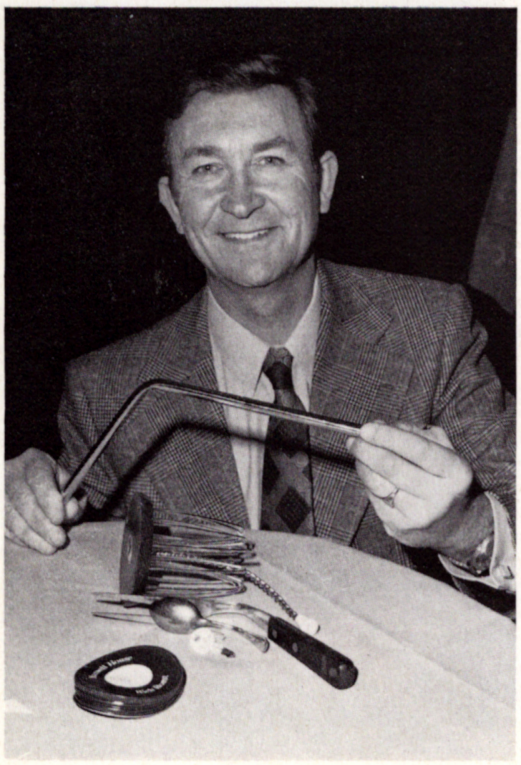
PKMB has repeatedly been demonstrated to be a fact, and scientists have begun to respond to the challenge it offers. A solution to the age-old mystery of how our minds interact with matter is much nearer than it was when Uri Geller came to public attention in 1972. Jean Pierre Girard feels that PKMB is an evolutionary mechanism necessary for Man's survival that science cannot afford to overlook. From the apparently useless ability to bend spoons there may develop enormously far-reaching effects on the world.

'This power,' says Belinda H.'s mother, 'must have been put there for a reason.'





Scanning electron microscope photographs – magnified 750 times – of (top) a section of a Volkswagen key that broke when Geller tried to bend it and (above) of a similar key broken by mechanical means. The paranormally broken key shows a uniform structure, the other key a random pattern



Left: George Porter with some of the objects he bent by PK while listening to Uri Geller on the *Jimmy Young Show* on BBC radio in 1974

Post script

Your letters to THE UNEXPLAINED

After the publication of the article entitled 'A gallery of psychic art' in issue 20, we received a letter from Graham Hudson, ATD MSIAD, a lecturer in art in Kent, England, that was to lead to a controversial exchange between The Unexplained *and Britain's leading psychic, Matthew Manning. First, an extract from the letter that started it all:*

I am no sceptic where psychic matters are concerned, but I do know something about drawing and painting and I feel that it is extremely doubtful that the supposed Lautrecs, Dürers, Beardsleys etc . . . actually were produced under the guidance of those dead artists. Yes, there is a stylistic similarity, but style is easy to achieve. . . . Criticisms can be made of the 'Dürer' hand studies by Matthew Manning. When an artist produces a sheet of work of this nature he really is *studying*, that is seeking to understand form and structure and represent it on paper. In the Manning 'Dürer' there is no seeking to understand form, no search for structure, only weak pastiche . . .

A copy of Mr Hudson's letter was sent to Matthew Manning with an invitation to answer it. Although Mr Manning had long since received a copy of the article in question he had made no comment on it. We were therefore surprised to receive the following letter and enclosure from Mr Manning:

You will find enclosed a copy of the letter I sent to Mr Hudson about my automatic drawings. I don't know whether it is what you expected me to write but I will not defend my work if it has been misrepresented by somebody else. I have always been at pains to stress that I don't claim my drawings are necessarily communications from spirits of deceased artists. You should have read my books . . . before you wrote your article.

Incidentally, did you know that one of the drawings you attributed to me is in fact an original work by the artist concerned?

And the copy of his letter to Mr Hudson read:

Your letter has been forwarded to me by *The Unexplained* with a request that I reply. I don't really see why I should reply about things which I have not written myself but on the other hand I don't like inaccuracies being perpetuated.

Unfortunately the writer of the article concerned [Lynn Picknett, who is also deputy editor of *The Unexplained*] had not bothered to properly read my book *The link* . . . I would therefore like to say that I have never claimed my drawings to have been communications from the spirits of deceased artists. . . . I feel that I was merely attuning myself to the continuing inspirational force created in the first place by the artist. That is why many of my drawings are only copies, sometimes not very good, of drawings already made by the artist.

You would agree, I'm sure, that appreciation of art is very personal and I would say that a number of art critics and experts have been very impressed with the drawings I made. Some were fooled by them – as were, it seems, *The Unexplained*. Some critics were very scathing about them. I was always interested to note that those who were most hostile were those who were themselves artists; art critics who were not working artists seemed more open to them.

Lynn Picknett wrote back to Mr Hudson, enclosing photocopies of various pages of the Corgi paperback edition of The link. *Relevant quotes from them are:*

The only explanation I have is that the artist appears to be making a point of identifying himself beyond a shadow of doubt by reproducing something with which he is already known to be associated. . . . The only artist to whom the use of colour presents no problem is the late Pablo Picasso. My experiences with him have been particularly interesting and different from those with other communicators. The first work from him came in July 1973, three months after he died. I had specifically asked Picasso to produce a drawing for me. (Page 122)

How do I ask Albrecht Dürer to draw through me, for example? . . . The fact that the person I wish to communicate with does not speak English is apparently no barrier. . . . (Page 123)

There are . . . peculiarities in some drawings that Aubrey Beardsley has produced through my hand. . . . More than any other artist, Beardsley made many mistakes when drawing through me, but instead of covering them over with paper, which obviously he could not do, he inked over them and changed them into something different. (Page 131)

Mr Hudson replied:

The following comments on Matthew Manning's reply to me may be of interest:

The statement that Matthew Manning has never claimed his drawings to have been communications from the spirits of deceased artists is clearly refuted from the photocopies taken from *The link*.

'This is why many of my drawings are only copies, sometimes not very good, of drawings made by the artist.' This is a curious statement, because if drawings *are* admitted to be 'not very good' then *ipso facto* they can offer no evidence for their being produced under the guidance of dead artists. All they can show is some similarity in style, and, as I said in my letter, style is very easy to imitate. . . . The fact that one of the *other* pictures illustrating the article was taken from an original rather than a Manning copy does not invalidate the argument.

It would be interesting to know the identities and professional standing of the 'art critics and experts' who have been very impressed with the Manning drawings. It is also interesting that those who seemed more 'open' to the drawings were 'art critics who were not working artists', whereas those who were most hostile *were* working artists. As a working artist myself I can understand their feelings . . .

Our error, as pointed out by Matthew Manning, was the inadvertent reproduction of an original *Leonardo de Vinci sketch on page 391. The Manning version, which is very similar, can be seen in* The link.

Send *your* letters to THE UNEXPLAINED, Orbis House, 20–22 Bedfordbury, London WC2N 4BT

Among the sheep and goats

Believers and sceptics – sheep and goats – were out in force at this year's international conference of the Society for Psychical Research. THE UNEXPLAINED went to Bristol to hear the arguments for and against the paranormal and came back with this report – and some stunning new material for future issues

The amount of material to take in at this year's SPR Conference was prodigious: 24 papers were delivered in three days – though they were often more easily digested than the officially-available food. Solid research, theoretical discussion, general comment and bizarre assertion crowded one after the other, and what follows is a survey of only the best and the worst.

There were two particular disappointments. The conference was amazed and confounded at Dr Keith Hearne's revealed opinion that hypnosis 'does not exist'. No alteration of consciousness or awareness occurs, he said: all that is demonstrated is the extraordinary suggestibility of the human race. The conference was not to be mesmerised into accepting this, however, and in such a supposedly rational and disinterested company it was fascinating to feel the atmosphere thicken with hostility as the work of intended demolition proceeded – and failed. One venerable medical man protested that he had used hypnotic techniques to suppress pain for decades. Not so, said Dr Hearne: there had been reports of people 'grimacing'. What about Mrs Jane Evans, whose hypnotic regression to a 'former' life was partly confirmed by the discovery in York of the crypt where, as the Jewess Rebecca, she was murdered in 1190? Not scientific, said Dr Hearne. 'You,' suggested one member loudly, 'are going too far.'

'Hilarious were it not so inept . . .'

Dismay seemed the only appropriate response to the paper that was presented by Drs T. Troscianko and Susan Blackmore on one aspect of the 'sheep-goat effect' – an attempt to discover whether 'sheep' were or were not more likely than 'goats' to report an unusual occurrence as paranormal. The 'experiment' involved asking subjects to recognise and to generate strings of 'random' numbers. Their results, and their interpretations of chance events, were tabulated against their professed sympathy for psi. Can a set of questions that bears a strong resemblance to an IQ test, and may even depend on learned skills to be answered properly, constitute a reasonable test of reaction to paranormal events? What is one to make of the questions themselves, if the learned and intelligent conference members, asked to answer one, couldn't understand it? This demonstration of how not to design an experiment would have been hilarious were it not so inept; at least the statistical results collapsed into gratifying insignificance. Some of the classic witness-reliability tests would surely have been more appropriate – setting up an apparently paranormal event and checking the differences between the reports of sheep and goats. If the SPR wants its subject to be accepted as a scientific discipline, this is no way to go about it. So why was this ill-conceived paper accepted for the conference in the first place?

But now for the good things – most of which we have arranged to bring you in future issues of *The Unexplained*. In 1919 C. W. Leadbeater and Annie Besant published *Occult chemistry*, in which they described a deep trance state in which it was possible to see the ultimate constituents of physical matter. These are now known to be smaller even than the quarks that make up subatomic particles – and Dr Stephen Phillips has discovered that the mystics' description of them fits the scientific description closely. Dr Rupert Sheldrake proposed that both chemical and biological behaviour is the result of matter forming 'habits' – continuing to act (or evolve) in a particular way not because that way is inevitable, but because reality has somehow *got used to it*. Thus, for example, a laboratory rat trained to do a certain task in Japan in 1981 will learn more quickly than an entirely unrelated rat, trained by different scientists, did in India in 1980. The conventional theories claim this cannot happen – but it does, and Dr Sheldrake is making a brilliant attempt to explain why.

Serena Roney-Dougal suspected that people who fail to show ESP abilities may have been suppressing them – they were, consciously or otherwise, *justifying* their 'goatish' attitudes. So she disregarded the statistical data for once and found that people declaring ESP 'misses' in Ganzfeld experiments frequently and accurately alluded to their targets in their 'mentation' period (the description of their stream-of-consciousness) – then chose the wrong target!

The threat from psi

This aspect of the 'sheep-goat effect' was dealt with in Dr Charles Tart's long and fascinating discussion of *why* so many people fervently reject psychic phenomena. Essentially, said Dr Tart, we can't afford to believe in telepathy or clairvoyance. Psi radically threatens our view of the world and our way of life. (Imagine the state of the second-hand car market if we were all telepathic!) And it would be intolerable to know, all the time and in every way, what our fellows were thinking and feeling – we'd go mad under the strain. Not surprising, then, that science – that paragon of reason, sanity and truth – should reject and vilify an interest in the paranormal, even though Serena Roney-Dougal's work suggests that we *all*, to some extent, have a talent for ESP.

The best came last. Julian Isaacs described the Cox mini-lab, invented for the SORRAT experimental group of Rolla, Missouri, USA. Essentially a sealed glass tank, with such paraphernalia and measuring devices as one chooses in or around it, the Cox mini-lab offers a superb means of making fraud-proof experiments and fully documenting the results. And bizarre indeed were the results we saw on film: pens writing with no visible means of support, clocks running backwards and forwards, leather rings forming links by themselves, objects leaping hither and yon. Still more strange, the lab had among other things teleported letters to members of SORRAT (in sealed envelopes, with correct postmarks, but with obscurely foreign stamps) – an event that indeed reached the 'boggle threshold', as Julian Isaacs put it. If others can achieve anything like these results – and with refinements the mini-lab will provide unparalleled documentation of psychokinesis – we shall surely see the sheep separating from the goats: if anyone dare admit to being a goat by then.